RAILROAD GAZETTE

QUARTO VOL. I. No. 17. TWENTY-FIRST VOL.

A Journal of Transportation, Engineering and Railroad News.

$4.20 PER ANNUM, POSTAGE FREE.

NEW YORK: 73 Broadway. FRIDAY, APRIL 27, 1877. CHICAGO: 77 Jackson St.

AN INDEX TO ADVERTISEMENTS in this number of the Railroad Gazette appears on page vii.

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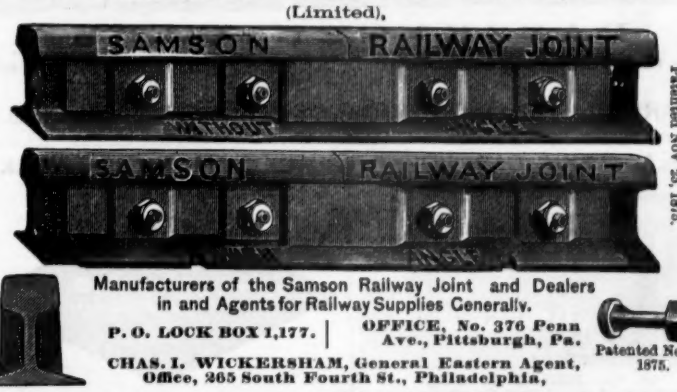

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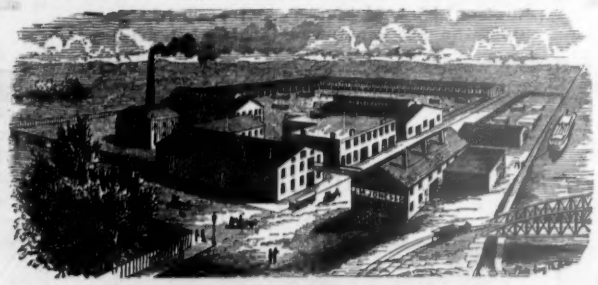

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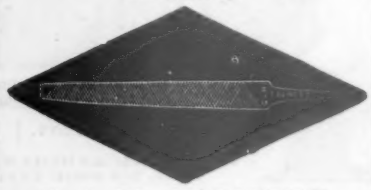

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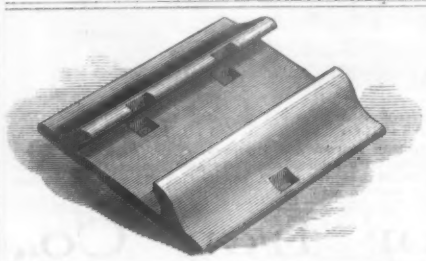

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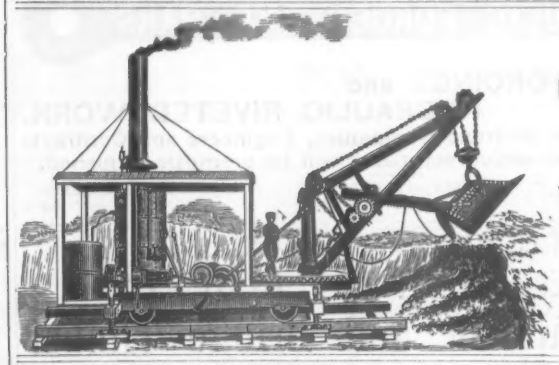

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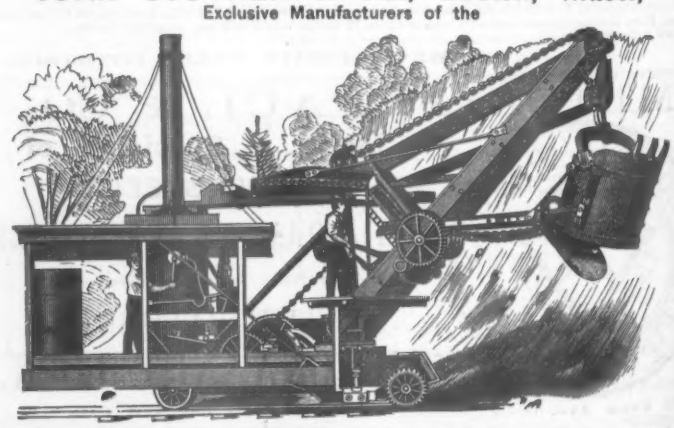

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[This index to the advertisements in the RAILROAD GAZETTE *is published in order that they may be more convenient and valuable to those who make use of them as a directory of railroad supplies and equipment. A number of advertisements appear only "every other week" or "once a month;" in such cases, where the advertisement is not in the current number, a blank appears instead of the folio opposite the name.]*

RAILROAD GAZETTE

FRIDAY, APRIL 27, 1877.

Damage to the Track by Mogul Engines.

The following is from the proceedings of a meeting of the road-masters of the Atlantic & Great Western Railroad held at Kent, O., Oct. 26 last:

The next subject considered was the damage done to the track by Mogul engines. The road-masters were asked to corroborate their statements by absolute facts.

MR. ARMSTRONG—Not having any Mogul engines on my division, I cannot get at the facts.

MR. COLLOPY—I cannot tell why Mogul engines are more destructive to track than other engines. While one of them was in use on my division, during a part of the summer of 1874, I had more trouble in keeping the curves (laid with sixty-pound iron) in line, than I had before, or have had since.

MR. MULVEY—The Mogul is heavier than any other engine. If the flange was taken off the centre driving wheels, they would not crowd on the outer rail. They are hard on the leads of switches. I know it is so in Shenango yard, where we have one switching.

MR. NEWMAN—The Mogul engine is the easiest on a straight line, with the same weight, as the weight is more evenly distributed on the drivers; but on curves it depends entirely on the length of the wheel base. Absolute facts cannot be had where both classes of engines are running on one track at the same time.

MR. BURGESS—They are more destructive to track than the ordinary engine, because they are heavier. They press too much on the outside rail on sharp curves.

MR. MCINARNA—I am unable to state the amount of damage to track by Mogul engines, because at the time two or three of them were running on my division, there were a number of ordinary engines running, and I could not ascertain which was the most injurious; but in my opinion the Mogul engine was, because since they have been taken off the track, all the curves are easier kept in line, and there are not as many fish-plates broken. The Mogul engine is more destructive to track than the ordinary engine because it is heavier. It will do as much damage running at the rate of 15 miles per hour as the ordinary engine at 22. They are longer than the ordinary engines, and having six driving wheels are much harder on curves, and twist the track out of line. If the Mogul engines are intended principally for freight service, there is no economy in their use, because the amount saved by hauling a few more cars will have to be expended in track repairs. They are also hard to handle, and in starting a train pull out drawheads and break links, causing the train to be detained and in trying to make up lost time they run at a reckless speed down grade and across sags. I have known them to pull out drawheads when running at 18 or 20 miles an hour, when commencing to use steam approaching heavy gradients. This is very uncommon with ordinary engines.

THE CHAIRMAN (Mr. Charles Latimer, Chief Engineer)—This evidence is not satisfactory in the question of expense without calculation.

MR. ALSOP—I have no Mogul engines running on my part of the road, therefore I cannot answer the question.

MR. RYAN—I do not know much about the Mogul engines, as they were not on the fourth division very long.

MR. DOYLE—I found a great many rails bent and kinked after Mogul engines.

THE CHAIRMAN—You have a Mogul engine constantly running between Cleveland and Randall, and ought to be able to tell more about it.

MR. DOYLE—It is not as bad as 222 and 223; not near as bad.

MR. W. J. THOMPSON—I know that when engines 96, 97 and 98 were on the Mahoning Division, they bent and broke more iron and crowded the iron out on the curves more and worse than all the other engines that ran over it. The greater the weight and the distance between the drivers the harder it is on curves. The same theory can be applied to the six-wheel trucks under coaches; the longer the truck frame the harder it is on the curves. I do not think that an engine with six drivers is any harder on straight track than one with four; if any difference it is in favor of the latter. The more bearing you can get under the same weight the easier it is. The Moguls are the heaviest engines, and the heavier the engine the harder it is on the track.

MR. BOWEN—Mogul engines are severe on track on account of their extreme weight. Ties that would last under ordinary engines eight or ten years must be taken out on curves before their full service, because there is an awful pressure on the rails from Moguls having flanges on all the driving wheels. There is a constant demand for spikes by the section foremen.

THE CHAIRMAN—Mr. Hallar, we would like to hear your opinion.

MR. HALLAR (Superintendent of Bridges and Buildings)—It is just the thing we want to tell every weak spot; when it is safe for a Mogul engine, it is perfectly safe for anything else.

MR. H. C. THOMPSON (Assistant Engineer)—This question is the amount of damage done to track. I cannot do any more than agree with the road masters, because the information I got regarding the damage is from them. I gave you some facts some time ago of the weights and comparisons of engines, which I will here repeat. The weight on the drivers of engine 205 (our lightest engine) is 41,900 lbs. The weight on four drivers of our heaviest engine is 45,600 lbs. Engine 96 (Mogul), weight on drivers, 75,500. This shows there is more weight on a single driver than on our heaviest engines. Hence it may be supposed that with an increased weight on drivers and a greater wheel base more damage to track will result. I understand that on the Erie road they have them with and without a flange on one pair of drivers. I am not prepared to say which is best. There might be an improvement in the truck to make them easier on the track, as I have heard it stated. The forward truck does the damage. I have purposely neglected to state what the engines will haul, as the question of work does not properly belong to this head.

THE CHAIRMAN—We simply wish to consider the question of damage to track, and why there is more damage. A man well posted on this subject says that the adjustment on the forward truck or the forward wheels is an important consideration in our Mogul engines. If the weight is thrown forward to any extent, or the proper proportion is exceeded, it is probable it produces more damage. He said he was opposed entirely to the angle wheels and claimed there should be a bogie truck. Some of you may not know the origin of this term. I will give it to you as I found it in "Notes and Queries." Some miners in Wales were looking at the new style truck coming around a curve. One said it is a bogie, meaning that it was a spirit. That is the origin of the word. For a long time I did not understand the meaning of the term, and many persons get an erroneous idea about it. It is simply the truck (four-wheeled or more) in general use. I will read to you a letter which I received last month from C. H. Hudson, Superintendent and Engineer of the Chicago, Burlington & Quincy Railroad Company. Speaking of the opinion which you gave a few months ago, he says:

"They seem to show that those engines were hard on track. Were the engines themselves perfect, or have later builders improved the design? Did the engines take greater loads, and was the damage per car mile, or per ton mile any greater than other engines? It is a fact, I presume, admitted that the cost of repairs of engine per mile run is greater than that of the common engine; but those who have used them most, claim that the cost per car mile is not greater. If this be so and the cost of road repairs and other items of the kind be no more per car mile, though they may be per mile run, then there is an advantage in their use, as in the item of train service we save, as well as in the item of firing up and care of engines. I have had a good many discussions on the subject, but found no one who could tell, except in a general way, what the effect was on track. I am anxious to get at the damage to the track caused by these engines."

Now, how many cars do these engines haul?

MR. BOWEN—They have drawn on my division for twelve months 35 cars; 20 cars are enough for all other trains. A train each way every day, 12 trains a week.

THE CHAIRMAN—That makes 70 cars a day.

MR. BOWEN—It was that number going down. They do the work of an engine and a half.

MR. ARMSTRONG—On my division the smallest engine hauls 18 cars, the New Jersey engines 20, and the Mogul, 24.

MR. COLLOPY.—I do not know how many cars of freight the Moguls will pull; they pull from 25 to 27 cars of gravel.

MR. MULVEY—They will haul 25 cars, and the others 17 or 18.

MR. NEWHAM—I have had very little experience with them.

MR. BURGESS—They will take 25 cars over the third division; the others 17 and 18 cars, except engines 100 and 99, which have larger cylinders.

MR. MCINARNA—Seventeen to 19 cars; Moguls 25 cars.

MR. ALSOP—Engines 99 and 100 have 17×24 inch cylinders; I do not see why they do not pull the same number of cars.

MR. BOWEN—There is a difference in them; engine 96 is hauling 36 cars for a regular train; the other one is hauling about 30 cars.

MR. FRENCH—It is a little out of repair; 97 is not in good order.

THE CHAIRMAN—Now, how about the other engines?

MR. BOWEN—The ordinary engines are hauling about 20 cars.

THE CHAIRMAN—I think you must have made a mistake in the number of cars. Do both Moguls haul 35 cars (loaded)?

MR. BOWEN—Only one of the Moguls pulls 35; the other only 30.

MR. HALLAR—I think Mr. Bowen is right.

MR. DOYLE—Have no Moguls on my sub-division, except a helper, and that hauls six more cars than an ordinary engine.

MR. W. J. THOMPSON—I never had any of them; the ordinary engines haul 18 to 20 cars.

THE CHAIRMAN—Mr. Forney, the editor of the *Railroad Gazette*, said, in reference to your strictures on the Mogul engine, that it was strong testimony, but that it would have been much more conclusive if the Master Mechanic of the road could have joined in the discussion and cross-examined you; he asked me to look into the matter particularly at this time; now, if you were wrong in any of your statements at the last meeting, you should correct them.

MR. RYAN—I believe the reason for much of the prejudice was owing to the road being new; rails were bent and the ties were in bad order.

THE CHAIRMAN—They were not in condition to hold them?

MR. RYAN—No, sir.

MR. MCINARNA—We had one Mogul hauling gravel; there was trouble all the time in starting the train, breaking in two, pulling out draw heads, etc.; the engine was taken off, and we did double the amount of work with an ordinary engine; the Mogul hauled 23 cars and the other engine 18.

THE CHAIRMAN—Generally I do not see as much force in your present opinions as I did at the last meeting. You are on record, and what you said is before me. I will read: "Mr. Ryan—They were the ruin of the fourth division."

MR. RYAN—When the track was new they ran Mogul engines over it; it was not ballasted and spoilt the iron.

THE CHAIRMAN—That puts a different face on it. Mr. McInarna said: "Where I keep up my track with one man to the mile, I would want two and a half men if Mogul engines were used."

MR. MCINARNA—I do not think I am wrong; I believe I am pretty near correct; there is a good chance to see the difference on my division.

THE CHAIRMAN—Mr. Bowen said: "I could not keep my track in line with them; I had them hauling gravel last summer, and could count every tie on the road."

MR. BOWEN—That should read "joint tie."

THE CHAIRMAN—I want to correct anything that is extravagant, if we have made any mistakes in the past.

MR. BOWEN—They do not do as much damage now, as they do not run as fast with the speed gauge in use.

THE CHAIRMAN—They haul the speed gauge, and are limited to fifteen miles an hour.

MR. BOWEN—Yes, sir.

THE CHAIRMAN—Mr. W. J. Thompson said: "They were used on the Mahoning Division till nearly all the iron was spoilt; I think they are the worst thing that can be put on the track."

MR. W. J. THOMPSON—I hold to that now.

THE CHAIRMAN—I told you to be entirely unbiased, and I excuse you from any difference in opinion; but in this case you have given an opinion as if we had all condemned the Mogul engines, as Mr. Doyle did upon one occasion; you should give an opinion that is moderate, not extravagant; your words "used on the Mahoning Division till all the iron was spoilt," "could count every tie on the road," are errors, of course. You got into an extravagant way of expressing yourselves. I want a deliberate opinion on the subject; let us have it with more moderation. Now, have you anything to correct?

MR. W. J. THOMPSON.—I think those engines bent more iron while there a year than the ordinary engines bent in four years. Three of them ran there a year and a half.

THE CHAIRMAN—They were not held down to speed?

MR. W. J. THOMPSON—No, sir; they were not limited in speed.

THE CHAIRMAN—What was the weight of the rail?

MR. W. J. THOMPSON—Fifty-six pounds to the yard.

THE CHAIRMAN—It was too light.

MR. W. J. THOMPSON—It was the opinion of everybody that those engines injured the track.

THE CHAIRMAN.—Mr. Mulvey said last year: "I do not like to see them; would rather see freight trains running thirty miles per hour."

MR. MULVEY—Yes, sir, I would.

THE CHAIRMAN—Mr. Collopy said: "I do not want them; they straighten out the curves; after one of them passes you can see a straight piece in the curve."

MR. COLLOPY—That is so.

THE CHAIRMAN—The question is, was that by fast running?

MR. COLLOPY—They ran as fast as they could; from 20 to 35 miles an hour.

THE CHAIRMAN—There was the trouble. Mr. Armstrong said: "I think the best place for them is on a side track."

MR. ARMSTRONG—Yes, sir, I think now as I did then. You ask for absolute facts from experience with these engines. I have had no chance to get at absolute facts since our last meeting.

THE CHAIRMAN—We had various extravagant expressions at that time, and now we want to correct any that were wrong; whatever you admit was wrong.

MR. ARMSTRONG—In my former statement, the question was, do Mogul engines injure track more than ordinary engines, and not how do they injure track. My reasons for making that statement were in reference to the Mogul engines in use on this road. First, they are too heavy for the rail we use, and will kink it. Second, the driving wheels and forward truck wheels being all fastened in boxes on the frame of the engine, and all of the wheels having flanges, they form a long wheel base. To get the engine to run around curves it has a lateral motion of two inches, and as the connection-rods and pumping fixtures are outside of the frame of the engine, they form a wide piece of machinery and are very heavy. The stroke of those rods is up on one side and down on the other, in every revolution of the driving wheels. They cause the engine, in working hard, or running at a high rate of speed, to oscillate on this lateral motion and put the track out of line. If our track was laid with 68 or 70 pound steel rail, I think it would be strong enough to resist the motion of those engines, but our present pattern of rail is too light for those engines. Where they run fast or work hard you will find the track out of line, and on sharp curves, if the spikes keep the rails from spreading, the head of the rail will show kinks. The forward truck wheel will crowd the outside rail on the curve, and the hind driving wheel will press out the inside rail of the curve.

THE CHAIRMAN—The sum of the matter seems to be that Moguls are a good thing with slow speed and a speed gauge to regulate them. It must be remembered that our Mogul engines are of the old pattern, and improvements have been made in them.

The following letter is submitted in connection with the discussion on Mogul engines:

Pennsylvania Railroad Company,
Philadelphia & Erie R. R. Division,
Williamsport, Pa., Nov. 18, 1876.

C. Latimer, Esq., Chief Engineer:

DEAR SIR—The question has led to quite a lengthy investigation into the average cost per mile of keeping up our track, and the extent to which that cost is affected by the weight of the locomotives used. I may say, speaking in a rough manner, that on the portion of our line where consolidation engines have been longest used, which has a grade of 105 feet to the mile, and over which every train is pushed by a consolidation engine, we have not been able, during the six years the engines have been used, to ascertain whether they are more destructive than ten-wheel engines would have been. At the beginning of this year we placed a few consolidation engines into the regular freight service on one of the divisions of our line, perfectly level, over which they have been hauling 80 to 90 cars, and making regular schedule time of our freight trains. The Superintendent of the level division informs me that he does not notice any special effects occurring from the use of these engines. Both on the mountain and level grades the curves are very sharp, the radii ranging from 650 feet upward.

We only have one engine of the Mogul type, which works as a switching engine in one of our yards. The Division Superintendent at that point speaks very highly of it, and does not notice that it injures the frogs and switches over which it is continually passing.

Yours truly, HOWARD FRY, Sup't M. P.

N. B.—We understand by a "Consolidation" engine, an eight-wheeled coupled with a pony truck ahead, and by a "Mogul" engine a six-wheeled coupled and a pony truck ahead. Should our investigation lead to any more definite figures, I shall have pleasure in forwarding them to you.

H. F.

April Meeting of the Master Car-Builders' Association.

At the monthly meeting in New York, April 19, at the rooms, No. 113 Liberty street, Mr. Leander Garey, the President, stated the subject for discussion to be "The Relative Cost of the Cast-Iron Chilled Wheel and the Steel-Tired Wheel," and called upon Mr. Atwood, a manufacturer of car-wheels, to state his experience.

MR. ATWOOD turned his attention to car-wheels some thirty years ago, aiming especially to produce a safe wheel. He designed what is now called the "Washburn" wheel, made with a hollow arch around the hub, which lightened it and made the wheel safer. This wheel he believed to be now on every road in the United States and Canada. He had watched the progress of the different steel-tired wheels, and was satisfied that they would be the cheapest in the end. The paper wheel he thought to be perfectly safe, though costly, but he believed that railroad men should not scruple about cost when life is in danger. For some five years he had been experimenting with a steel-tired wheel, which has been successful so far. He thought that, with good steel, it would outwear eight to ten cast-iron wheels. He had seen statistics of steel-tired wheels which ran 300,000 or 400,000 miles. His own had not been in use long enough for that, but showed so favorably that he was led to judge that they would wear half a million miles. He believed them to be the cheapest wheels railroads could buy. After they are worn too much for passenger cars they can outwear any half-dozen chilled wheels under freight cars. One reason for preferring a tired wheel was because you cannot cast a chilled wheel true. However true the chill, the iron will shrink so that it is not a perfect circle, and the wheel will shake the car. A pair of wheels got flats on the tires after running 100,000 miles, when he had them turned. He knew there was a risk in using cast-iron wheels, and he did not believe they had a right to take a risk in anything. He believed steel-tired wheels would be the cheapest by 50 to 100 per cent. when they once got to manufacturing them. The tire of his wheel weighed 336 lbs. It would wear down an inch safely under passenger cars and then run 200,000 or 300,000 miles more under a freight car. In 1860 he took out a patent for wheels cast in hot chills. With this he got a deeper chill and a more solid tread. It is, as it were, one solid piece of steel.

MR. GAREY said that it was a question in his mind whether a good cast-iron wheel would not give 25 to 50 per cent. more mileage, with quite a saving in power, if turned so as to be perfectly true and round.

MR. ATWOOD said that one side of a wheel always had a deeper chill than the other. The outside mould or chill expands as it is heated and leaves the wheel, and leaves one side first, and the side of the wheel which is against this mould longest will have the deepest chill. This could not be prevented. The turning of a chilled wheel does not better it for wear; the best part might be turned off.

MR. JOHN E. GREEN suggested that with steel-tired wheels, those which had been long in service would be considerably smaller than the new ones, and this might make more trouble than the irregularities in cast-iron wheels.

MR. ATWOOD said that care must be taken to have the wheels on the same axle of exactly the same diameter. Those on another axle of the same truck might be of different diameter. In reply to an inquiry as to why a hot chill gave a uniform depth of chill to the tread, he said it was because the mould was already expanded when the metal was poured in, and thus the two remained in contact longer. The shock of cold iron was not necessary to give a chill.

MR. GAREY wanted to know why wheels marked with the same number were not of the same size. He had found them varying ¼ to ⅝ in. in circumference.

MR. BRIGGS said there was no object in so marking them.

MR. ATWOOD had observed that a better wheel could be made on a dry day than on a wet one. The dampness would gather on the chill on a damp day.

MR. GAREY suggested that the wheel-makers offer to furnish

wheels to the companies at so much per thousand miles run, to induce the companies to keep mileage.

Mr. LEACH said that the first set of paper wheels made by his house were without anything to hold the tire to the paper. After running about six months they were put under a Pullman car on the Chicago & Northwestern, where they were never examined or turned. Ten of them ran 280,000 miles before they were touched. Then nothing was the matter but the wear of the steel tire, nothing being broken, but the flange becoming straightened or cut down. Afterwards wheels were sold to Pullman at a price based upon the average life of the best iron wheels as guaranteed by the makers, which was then 40,000 miles, and the price $22.50 per wheel. The charge for the paper wheels was $100 apiece with a guarantee of 200,000 miles. They made 150 or 160 42 in. wheels for Pullman last year. They run between New York and Chicago and make 3,000 miles per week. Most of them, he understood, had never been touched. They are made with the flange inside the tire bolted through the paper. The paper itself is indestructible. After running a wheel 280,000 miles and pressing off the tire, it took a sledgehammer to get the bolts out of the paper. He claimed it to be the cheapest wheel. The tire used was made by John Brown & Son, of Sheffield; those used on the locomotive trucks were Krupp's.

Mr. CHAMBERLAIN, of the Boston & Albany Railroad, said that on his road there were steel-tired wheels which had run 500,000 miles and any number that had run 300,000 to 400,000 miles. The average run before turning was 140,937 miles.

The cost of turning was 50 cents each, not including shop rent and use of tools. Some of the wheels did not make as large a mileage between the first and second turning as before the first. They have experimental wheels on the road made with tires of different degrees of hardness.

Mr. GAREY said that the mileage was not kept on his road (New York Central & Hudson River), but he could safely say that the average was more than 35,000 miles per wheel. The wheels of cars used for the fast mail train averaged more than 55,000 miles, throwing out those that were flatted. They were made by three different manufacturers.

Mr. GREEN, of the Louisville Car Wheel and Railway Supply Co., read a letter from Mr. F. de Funiak, who has charge of the rolling stock of the Louisville & Nashville Railroad, directed to him, the substance of which is in the following extracts:

"LOUISVILLE, April 7, 1877.

"DEAR SIR: At your request, we give below statement showing proper credit due you on wheel mileage, viz., the wheels failing to make the guarantee from causes for which you are not responsible, such as wheels flattened by sliding, broken in accidents, etc., and for which you were not charged with reclamation. The mileage statement includes every wheel of your make taken out, and of course it is proper that you should receive credit as stated.

"The total deficit on engine and tender wheels was	1,833,204	miles.
"You were responsible for and were charged reclamation for	667,235	"
"Showing balance to credit of mileage statement of	1,165,969	"
"Average of	58,636	"
"The total deficit on passenger, baggage express and postal car wheels was	3,259,952	"
"You were responsible for and were charged reclamation for	1,450,934	"
"Showing balance to credit of mileage statement of	1,809,018	"
"Which makes the average of this class of wheels, all 33 in.	58,279	"

"It is found that you were charged reclamation on every sleeping-car wheel taken out which failed to make the guarantee. This may not have been proper, and will be investigated.

"The average on this class would then be, as per mileage statement	53,727	miles.

"We are now using the Louisville Car Wheel and Railway Supply Co. make of wheels exclusively, and a great many more of these wheels have been put under than taken out.

"The total number of engine and tender wheels put under was	708	wheels.
"The total number do. taken out was	335	"
and the deficit on this lot of wheels, for which you were responsible was 667,235 miles, or equal to	14	"
"The total number of passenger, baggage, express and postal-car wheels put in was	1,670	"
"The total number do. taken out was 275; the deficit for which you were responsible was 1,450,934 miles, or equal to	29	"
"The total number of sleeping-car wheels put under was	672	"
"The total number of sleeping-car wheels taken out was 145: the deficit in this lot was 1,183,696 miles, or equal to	23	"

Mr. GAREY thought it hardly proper to lay all the blame on railroad companies. No road would willingly buy a poor wheel. It was a long time since they had had an accident on his road caused by a wheel. A man had offered to guarantee them 60,000 miles per wheel. If steel-tired wheels are to be introduced, the makers must first demonstrate that they will be cheaper.

Mr. CHAMBERLAIN suggested that it would be well to discuss the proper size of the proposed larger passenger wheel. It was a question whether it should be 40 or 42 in. He suggested that a circular on the subject be sent by the Secretary to car-builders and wheel-makers.

Contributions.

Canal Propellers.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In my article contained in your issue of the 13th inst., your comments appended thereto indicate that only two qualifications are claimed for the propeller as described, *i. e.*, "that it will propel a vessel, and that it will not disturb the water so as to injure the banks of the canal." The former qualification of course cannot be questioned and admits of no argument, as I was on the vessel when it was propelled by the device as described. The latter qualification you say is "not a matter of importance," as stated by the commissioners appointed by the State of New York, who were instructed to award a prize of $100,000 for the invention of the best method for propelling canal boats by steam. I have an article before me now which was clipped from *The American* at the time the premium was offered, from which I quote verbatum:

"The boat must, in addition to the machinery, carry two hundred tons of freight and be capable of running at an average speed of three miles an hour when loaded *without washing the banks*. The propelling power must be capable of easily stopping, backing and starting the boat, and the machinery be readily adaptable to the canal now in use."

Evidently the washing of the banks was of some importance at that time. Regarding the "economy" of the invention, a casual investigation of its principles of construction is sufficient to convince any person having a knowledge of the cost of machinery. But whether the "after cost" will prove less than when using other steam motors or horses remains to be proved, and can only be ascertained some time after the device has been used. The ease with which the boat "Alpha" can be started, backed or stopped, and its ready adaptability to any boat in use, fills the other qualifications necessary, and warrants the statement made by the writer, and which he still maintains, that "before very long the device will no doubt come into general use."

WM. J. NICOLLS.

BALTIMORE, April 20, 1877.

The Economic Theory of the Alignment of Railways—Explanatory

TO THE EDITOR OF THE RAILROAD GAZETTE:

I find myself obliged to ask space in your paper for a few corrections and explanations in respect to various matters touched upon in my recently completed series of articles. I fear it is now too late to make any corrections in the reprint of my articles, but it is my desire that this letter be informally included therein, in justice to all parties concerned.

I have been favored by Mr. Benj. H. Latrobe with the following letter, which sufficiently explains itself. For the sake of clearness and the greater convenience of the reader, I take the liberty (which Mr. Latrobe will pardon) of inserting my remarks and acknowledgments under each separate topic:

"BALTIMORE, April 11, 1877.

"MR. ARTHUR M. WELLINGTON, Civ. Eng., Danville, Pa.:

"DEAR SIR: As in your interesting series of articles in the *Railroad Gazette* upon 'The Justifiable Expenditure for Improving the Alignment of Railways,' you refer to some professional statements and opinions in my published reports and other papers upon points connected with the location and construction of railways and with their machinery, it is proper that I should offer some remarks upon them of an explanatory character.

"1. In quoting me as putting the frictional resistance of cars at 12 lbs. per ton (of 2,000 lbs.) you would appear not to have noticed that I included that from *curvature*, which, upon the part of the Portland & Ogdensburg Railroad then referred to, had an extreme radius of 637 feet. Estimating, as I did, the increased resistance due to this curve at 50 per cent. of that upon a straight line, the friction upon the latter would be but 8 lbs. per ton, which I believe is about the rate usually assumed for cars in good order."

In respect to this matter, I criticised the assumption of so high a rolling friction (page 433, Vol. VIII. of *Gazette*, p. 76 of reprint) not forgetting the resistance of curvature, as Mr. Latrobe suggests, but under the impression that the sharpest curves on the ruling grades of the Portland & Ogdensburg Railroad were 6° curves. This impression I derived from some part of Vose's "Manual for Railroad Engineers" to which I cannot now refer, and I have since, through Mr. Latrobe, ascertained it to be correct. Nevertheless, at the time of Mr. Latrobe's estimate it was *anticipated*, as it appears, that sharper curvature might be required on the ruling grades, and he very properly and prudently assumed them in his calculations. A correction is therefore due to him; and yet, as he is quoted on page 510 of Vose's "Manual," his high authority would be apt, in my judgment, to lead the student of engineering into erroneous views. Mr. Latrobe continues:

"2. In allowing an adhesion of *one-seventh*, in considering the question of the grades of that road through the Crawford Notch pass of the White Mountains, I had in view the effect of the climate of that region with the ice and snow of its winter and the moisture of its summer. On referring to the calculations made in that connection, I found that I had at first assumed a *sixth*, which on reflection I altered to the lower ratio from a wish not to overstate the effective work of locomotives upon the high grades of which I was then treating. I was of course aware that much higher adhesions had been realized upon the railways of the country and would often be upon the one about which I was writing."

In this matter, on page 441, Vol. VIII. of *Gazette*, page 78 of reprint, I claimed that $\frac{1}{6}$ instead of $\frac{1}{7}$ was the proper ratio to assume in adjusting grades, because it appears to be the almost universal ratio to which the customary weight of trains is unconsciously adjusted. The line in question, however, has a peculiarly unfavorable climate, and if it would be proper to assume a higher ratio on *any* line, it would be on the one in question; but I have little doubt that on that line also the $\frac{1}{6}$ is the *governing* or *average* ratio of cohesion, and, if so, that ratio and not the mimimum would seem to be the proper standard for adjusting grades. My authority in this case also, however, was Vose's "Manual," page 510, as already referred to, and on referring to the complete report (Fourth Annual Report, Portland & Ogdensburg Railroad, page 31), from which the extracts there given were abridged, I find that the abridgment has led me to do Mr. Latrobe injustice. It is there apparently implied that the adhesion was assumed for the sole purpose of determining the balance of grades, whereas it was *primarily* for the purpose of illustrating the disadvantages of very high grades (150 and 200 feet per mile) under unfavorable conditions of track. Therefore Mr. Latrobe's assumption is not fairly open to criticism, especially as the ratio of adhesion assumed makes little difference in the balance of grades; and yet I must still maintain that the abridged extract, unexplained, is liable to lead the inexperienced student to erroneous views. Mr. Latrobe's letter concludes as follows:

"3. While justifying myself upon these two points, I have, at the same time, to admit the commision of an error or two, for which I can account only upon the ground of that human fallibility from which I claim no exemption. I find, upon viewing my calculations of the proper load taken up the grade of 116 feet per mile upon the Southern or Saco side of the Notch summit, that, upon the data assumed as to weight and adhesion of engine and friction of tender and cars, it would have been 158.$\frac{7}{10}$ tons instead of 170 tons. The computed loads upon the 150 ft. grade of 117 tons and upon the 200 ft. grade of 77$\frac{1}{2}$ tons are right within a fraction. I have a more serious error to concede in regard to the comparison of the grades suitable to the two sides of the summit, which, for that of 116 ft. ascending westward should have been 77.6 instead of 63 ft. per mile; for the grade of 150 ft. westward 105.6 eastward instead of 93 ft., and for the grade of 200 ft. westward 150.2 instead of 139 ft. eastward. This error was the result of my assuming the freight in the westward bound train at a *sixth* of the gross weight of train going in that direction instead of a *fourth*, whereas it was a *sixth* of the gross weight of the *east*-bound train. I presume that these errors were the 'obvious' ones referred to in your article. Whether they were observed by any reader but yourself, I have no means of judging, but I am not the less obliged to you for putting me upon the scent to discover them, and having found them by revising my work, I am in duty bound to confess and correct them. I am happy to say, indeed, that they were harmless as far as the interests of the Portland & Ogdensburg Company are concerned, to whom my advice was given. If you will have this statement inserted in the *Railroad Gazette*, as understood in our previous correspondence upon the subject, it will, I hope, set the matter to rights.

"Yours truly, BENJ. H. LATROBE."

The loads which Mr. Latrobe gives, in the first part of the above paragraph, as 156.7, 117, and 77.5 tons, I have given (page 490 of *Gazette*, page 104 of reprint) as 149.5, 109.4, and 71.75 tons. These differences arise from an error of my own (running through several articles, but, fortunately for me, not very serious) which I have at last been given grace to see. I assumed that so much of the engine friction as would exist if it were a dead engine with disconnected wheels (approximately the same per ton as car friction) is a tax upon the adhesion of the engine when it is self-propelling, and thus detracts from the paying load. This plausible view is wholly erroneous. So much of the so-called "rolling friction" as arises from *journal* friction is internal to the locomotive, and although it consumes power does not tax the adhesion. The rolling friction proper (that between the wheels and the rails) is the only tax on the adhesion, and Mr. Latrobe informs me that early experiments of Mr. Jonathan Knight, the first Chief Engineer of the Baltimore & Ohio Railroad (a summary of which was published by Mr. Latrobe in the *Railroad Gazette* for April 7, 1876), indicate that this latter resistance contributes not more than $\frac{1}{4}$ part of the total. If so, the statement on page 602 of Trautwine's Pocket Book that "8$\frac{1}{2}$ lbs. may be assumed as the average car-friction, of which 3$\frac{1}{2}$ lbs. may be ascribed to rolling and 5 lbs. to axle friction," requires correction.*

The grades which, in the latter part of the above letter, Mr. Latrobe gives as 77.6, 105.6 and 150 2 feet per mile, I have given (page 490 of *Gazette*, page 104 of reprint) as 78.3, 106.8, 152.0 feet per mile, the fractional differences being due to my error above acknowledged. The same error causes all the grades given in my tables for the adjustment of grades (Tables G and K, pp. 491 and 544 of *Gazette*, pp. 110 and 115 of reprint) to be too high by about the same amount, viz., 2 feet per mile as a maximum and less than 1 foot per mile for ordinary grades.

I owe Mr. Latrobe a further retraction and apology in having stated (page 441 of *Gazette*, page 78 of reprint) that the ruling grade, coming east, of the Portland & Ogdensburg Railroad was in fact reduced to 63 feet per mile, thus causing needless expense. So far was this from the fact that, instead of being 63 and 116 feet, or 78 and 116 feet, the ruling grades are 104 and 116 feet, for an inequality of traffic of 3 to 1. My error lay in a too hasty deduction from Professor Vose's statement ("Manual for Railroad Engineers," page 57) that "*guided by the considerations submitted by Mr Latrobe*, the final location was, with great skill and the utmost patience, *pushed to a most successful completion*." I was unable to interpret this language as meaning anything less than a result substantially in accordance with the eminently sound principles laid down in Mr. Latrobe's report. It would appear, however, that the "most successful completion" lay in the attainment of an *average* gradient on the western slope somewhere near that recommended. This being so, I cannot but regard Professor Vose's pronounced approval, in a text-book for the guidance of students, as decidedly too enthusiastic; but this is little excuse for my hasty assumption, which, even if correct, was unnecessary to my argument and therefore better omitted. I may be allowed to add that I was less struck by the fact that any one man should fall into chance errors from which the ablest are no more exempt than others, than that such errors should escape detection during the construction of the road and during numerous subsequent citations. This consideration led me to speak of them as "obvious," which is perhaps too strong an expression.

I desire also to make a correction in respect to my discussion of alternate routes for the Cincinnati Southern Railway. I have been for some time in correspondence with an engineer now occupying a responsible position of that railway, in whose fairness and impartiality I have entire confidence, and I have become satisfied that (on page 3 of the *Gazette*, page 147 of reprint) I materially under-estimated the cost of the alternate route which I proposed. My error mainly arose from an insufficient allowance for the enthusiastic interest in the enterprise of the author of the "Preliminary Report on Surveys," when I was considering his description of the route in question; and I more especially erred in assuming that the expression "surface work" (which has a technical meaning to me, as, I doubt not, to most of my readers) could not include any *considerable* proportion of classified material. I might, as I think, make my error excusable to fair-minded men, except that I have no disposition to enter into further discussion. The estimate of my correspondent showed a total cost for the Sequatchie valley line (which I proposed) of $4,701,000 as against $7,124,550 on the adopted line, whereas my estimate was only $2,084,000, plus 33 per cent.; but the former was for 30 or 40 feet through-grades (and in one case, for a short distance, 50 feet grades) instead of 20 feet through-grades, which I assumed to be practicable. In respect to gradients, I cannot but believe, after full consideration, that my informant has in great degree fallen into the very common error of assuming

* In this connection I would note that the "Table of Journal or Axle Friction," given on p. 601 of Trautwine, is evidently defective. The co-efficient of friction of wrought iron on brass with continuous lubrication is given as 0.054. Testing this, we find that an average rolling friction of 6 lbs. per ton is frequently realized in cases (as a recent authority, see Experiments of L. S. & M. S. R. R., Trans. Am. Soc. Civ. Eng., October, 1876.) Assuming that this is *all* axle friction, it is overcome with 30-inch wheels and 3½-inch journals, by a leverage of $\frac{30}{3.5}$ and we have as the co-efficient of axle friction $\frac{6}{2000} \times \frac{30}{3.5}$ = 0.026, a difference of over 100 per cent. Yet an axle certainly operates under more unfavorable conditions than average shafting. This erroneous table is also given in Haswell, page 350; Molesworth, page 77; Hamilton, page 320, and probably in all the other pocket-books. It came originally from Morin.

that what was not done, because it was not attempted, therefore cannot be done; but, bearing in mind his superior opportunities for obtaining a general knowledge of the ground, it is certainly *possible* that to build the Sequatchie valley line with ruling grades no lower than 30 feet per mile would cost as much as to build the adopted line, and this I will admit. According to my present information, this is the utmost stretch of possibility which is or can be claimed, and, if so, it affects my argument only in degree; but any one who assumes to criticise others has no claim for indulgence when he himself falls into error, and therefore I cannot complain if the acknowledgment of an error of degree shall be assumed to vitiate my entire discussion of the alternate writers in question. It will be but the common fate of any one who seeks to preserve impartial fairness rather than his own reputation for infallibility.

In respect to my suggestion of a possible alternate route down the South Fork of the Cumberland River (page 4 of *Gazette*, page 155 of reprint), my correspondent informs me that the indications of that portion of the route which I have personally visited were in fact deceptive, as I suggested might be the case; and that such a route would in fact "encounter insuperable difficulties," as I also suggested. In so far, therefore, as the suggestion carries with it any implication that any overnight might have been committed in that respect, it is wholly unjust and I regret and retract it. It will stand as an illustration of a principle, which was all I intended.

In the introduction to the reprint of my articles (page xv.) I have, while commending the exceptional excellence of the location of the Baltimore & Ohio, Pennsylvannia and Erie Railways, stated that "each of them contains grave errors of location, if the writer be competent to judge." I regret that I did not add "in the light of modern knowledge," as more clearly conveying my meaning, although this is plainly implied in the context. In justice to my own good sense I desire to add that the errors I refer to are three: 1st. An imperfect balance of ruling grades for an unequal traffic, from which each of those lines has suffered more or less. 2d. An imperfect inter-adjustment of ruling grades and curvature, which is still, in my judgment, an almost universal source of error and waste. 3d. An inaccurrate balance of economic advantages, in some cases, in the adjustment of minor details of alignment. No one of these assumed errors can justly be regarded as derogating from the distinguished abilities of the engineers of these lines, but the point I desire to make is, that it is discreditable to *copy* and *continue in* errors which in the beginning were more than excusable. ARTHUR M. WELLINGTON.

DANVILLE, Pa., April 21, 1877.

Keeping Down Weeds.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In many sections of the country the keeping tracks clear of weeds forms a large item of expense. As far as I have traveled on Iowa roads, I find the only tool used to cut weeds on track is the ordinary shovel. I find that it is not adapted for this work at all: it requires too much stooping, and where ties are close to each other a good deal of scraping around under the rails. Besides, in cutting weeds with the shovel the earth is usually scooped off the centre of the track at each cutting, only to be shoveled back from the sides to middle of the track in the beginning of winter. I am convinced a new tool is needed, something similar to a gardener's "scuffler": an implement with a 6-inch face slightly beveled, kept with a good edge, having a long light handle, like a hoe handle. The weeds could be cut, no soil need be removed, and one man could do as much work as two now do with an ordinary shovel. In using a new tool adapted for this work thousands of dollars worth of energy could be saved annually on our Western railroads. J. SAMPSON.

DUBUQUE, Iowa, April 18, 1877.

The Elevation of the Outer Rail on Curves.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have just read a brief account of the late disaster which occurred to the fast English train, "Flying Scotchman," which, as the account states, "left the rails when passing a *sharp* curve at a speed of 60 miles an hour, or more." So far as I have yet been able to learn, the accident must be classed among the long list of "unexplained" derailments. It would, I think, be of great value, could we by some reliable means get at all the facts and circumstances surrounding each similar case. We would like to know whether the track is straight or curved; and if the latter, what the degree of curvature, and also the amount of super-elevation given to the outer rail. I have reason to believe that careful investigation would reveal the fact that the condition of the track in curves even on many of the leading roads is comparatively much inferior to that in the straight portions of the line. This is so, partly because track-masters do not fully comprehend the necessity of giving special attention to their track at those points; partly because of the greater difficulty of detecting defective alignment there, thus tempting trackmen to neglect the curves that more time may be given to making the straight track *look* well, and partly because of the greater wear and tear at those places. Perhaps a few figures will help us to trace the connection which exists between a combination of sharp curves, high speeds and bad track, and their observed bad effects. To counteract the tangential force of a train on a road of "standard" (4 ft. 8½ in.) gauge, moving at a speed of 60 miles an hour on a curve of 1,200 feet radius, requires that the outer rail be elevated about twelve (12) inches, while an elevation of only one-third of an inch is required for a speed of ten (10) miles an hour. I have in mind one of our most important roads, whose track-men are instructed to elevate the outer rail three-fourths of an inch per degree of curvature. In the case above named, this would amount to about three and one-half (3½) inches, or 8½ inches less than would be required for a speed of sixty miles an hour. A locomotive weighing 100,000 lbs., moving at the rate of sixty miles per hour over such a curve, thus adjusted, would exert a lateral thrust upon the rails of not less than 15,000 lbs. Now, if in combination with this, the rails are not well fastened to the ties, or the joints not in good condition, is it great cause for wonder that "unexplained" derailments occur, from the spreading and breaking of the rails, or from the locomotive or cars mounting the track? Finally, as sharp curves seem to be a necessary evil, and the increased expense of separate tracks for fast and slow trains is usually deemed too great, would it not be well to reduce the speed of the former, and *increase* that of the latter, on sharp curves, thus making it possible for the track-master to so adjust his track at those places that the danger of derailment, and also the wear and tear of rolling stock and track, would be greatly diminished? E. S.

Executive and Engineering Ability.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your extract from Mr. Jervis' memoir deserves to be impressed on owners of railroads.

Any one who has conducted business requiring the labor of great numbers of men will recognize the fact that executive ability is not possessed by every one: a man may be a good designer, master of all the details of his business, and yet not have that peculiar ability that is necessary to successful management which we call executive, that is, the power to execute his own or others plans.

It does not necessarily follow that engineers, from their training, must possess this quality: when they do, it makes their services very valuable indeed.

To judge men and their peculiar fitness for certain duties, and to have the firmness to assign them to those duties in disregard of other influences, and to so look over the whole ground and see that you have the right man in the important places, is a quality that no amount of technical education can give. If possessed in a slight degree, association with those who are highly endowed strengthens it. In a great many instances, subordinates taken from under such training and placed for themselves in difficult places make failures. I think it was Louis Napoleon who said, "The executive mind must govern." No one of the least reflection but will recognize the fact.

I very much doubt whether any road can be kept out of the receiver's hands, under the best management to be had, while the President or other officers use it to advance their own private affairs. When freight agents give drawbacks, who can tell what proportion of it they get? Purchasing agents have inducements held out to them that some do not resist. President or directors may own a furnace, and buy their wheels, axles and rails from parties who agree to take the product of that furnace. Or they may be interested in manufacturing establishments which sell their goods to the roads at prices above the market, under the plea that it is best to pay a good price and get a superior article, which no doubt is true. Do master mechanics complain of wheels or other articles under such circumstances? Then, when the road is in the hands of a speculator, he can let it run down somewhat and thus increase the net receipts, after which he sells out, and the next manager will compare very unfavorably before the public.

Mr. Jervis in the conscious rectitude of his intentions may look on engineers trained as he indicates, and with their professional pride aroused, to bring out the railroads; but until honesty and fidelity to the spirit as well as law of one's trust are recognized as the sole factor, we must go on and be the sport of any speculator who plans and gets control. S.

The Personnel of Our Railroads.

Some material changes in the *personnel* of some of our large corporations is likely to result from the present extraordinary depreciation of stocks. We reach this conclusion from the following facts: The management of railroads has heretofore been largely associated with speculative operations. A number of men of means would combine to secure to themselves the control of a company, or, in some cases, a series of more or less connected companies. To accomplish this, they would buy up among themselves such an amount of shares as, with the co-operation of existing stockholders, would enable them to elect themselves to the direction. Their means being insufficient for paying outright for all the stock thus procured, they would make arrangements with their broker or banker to "carry" a certain amount of the stock upon a margin, generally a liberal one; while another portion of their holdings would be paid for in full, to be used as a means of protecting the stock held on margin, or to provide the means for engaging in other speculations. The stocks thus held have constituted the main portion of the material on which the speculative operations of the Stock Exchange have been conducted; and it is the manipulation of these speculative holdings that produces the constant fluctuations in the values of this class of investments, far more than any considerations affecting their intrinsic worth.

So long as these large and generally wealthy holders had plenty of resource to back their securities, by buying whatever speculative sellers might choose to offer, they could keep up the market value of their stocks and, sometimes, could punish the "bears" by compelling them to pay high prices for the stock needful to make their deliveries. The whole drift of recent times, however, has been to gradually deprive them of the means required to thus protect themselves. Their assets, of whatever kind, have largely shrunk in value; and the fall in the price of their stocks has caused them to draw upon their reserve means to keep good the margins on the stock being carried for them, until at last they are powerless to protect their holdings. The "bears" have thus got these large holders entirely at their mercy, and can put the prices of stocks virtually as low as they please. The "bears" appear to be in no haste to take advantage of their power, but, apparently with a consciousness that the game is safely in their hands, they go deliberately to work and attack, one after another, the weak points or the weak holders, as if in pursuance of a plan coolly arranged in all its details.

There are some capitalists connected with company management who have been prudent enough to buy no more stock than they could pay for in full. They are safe. They may lose largely in the market value of what they hold; but there is no possibility of their being cleared out through failure to keep up margins, and, when the bottom has been reached, they will be in a position to repair their fortunes by buying in prospect of an advance in prices. But a far larger portion of this class own considerable amounts of stock on which they have borrowed money, and these gentlemen the "bears" appear to be testing in detail. It is not necessary to recite the cases of men heretofore identified with the control of large properties who, under this process, have been drained of their means and must be regarded as erased from the future lists of directors. The number, however, who have already retired from this kind of business is small compared with those who, while not fatally injured, are yet sufficiently wounded to necessitate their ultimately retiring into a narrower sphere of operations.

It is obvious that, under these circumstances, we must look for an important redistribution of railroad ownership and many changes in the *personnel* of boards of direction. Whoever may be the successors of the retired ones, it is to be hoped they will thoroughly comprehend the moral suggested by the retirement of their predecessors. The past twelve months has taught the circle of railroad capitalists that to associate speculation with the control and management of their companies is a very risky game, to be played at only by men of very large means and upon very conservative methods. There will be wrecks enough lying around to warn all prudent men against a business in which so much may be unavoidably lost after it has been so easily made. If the lesson should lead men of means to shun putting their money into railroads for the purposes of speculation; and if the stocks thus depreciated should be bought up largely for the purposes of *bona fide* investment; then we may anticipate a different order of management from what we have heretofore been accustomed to. From all appearances, the evils connected with the past administration of our railroads are destined to be in a large measure remedied by this entirely natural method of cure; which will be a thousand times more efficacious than all the palliatives that are sought through legislation.—*New York Daily Bulletin.*

St. Louis Headquarters of the Master Mechanics' Association.

The following circular has been issued, dated April 19:

To the Members of the American Railway Master Mechanics' Association:

On account of the burning of the Southern Hotel, the tenth annual meeting of this Association will convene at the Laclede Hotel, in the city of St. Louis, May 15, 1877, at 9 a. m., where accommodations for members and their families have been secured at from $2.50 to $3 per day. (Full particulars given on application to the Committee of Arrangements.)

Members are requested to notify the Chairman as early as possible of their intention to be present. Those accompanied by their families should state the number of rooms required.

JOHN HEWITT,
O. A. HAYNES,
A. J. SANBORN,
} Committee.

Address JOHN HEWITT, Supt. M. P. & M. of Missouri Pacific Ry., St. Louis, Mo.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Chicago, Danville & Vincennes.—The purchasers of this road at the foreclosure sale having taken possession of the property, the following are announced as officers of the road until further notice: F. W. Huidekoper, General Manager; Edmund L. Du Barry, Superintendent; J. C. Calhoun, Treasurer; A. S. Dunham, Auditor; W. B. Williams, General Freight and Ticket Agent. The change took place April 19.

Nevada County.—At the annual meeting recently the following directors were chosen: John C. Coleman, Edward Coleman, Wm. Watt, J. M. Lakeman, Grass Valley, Cal.; Niles Searle, T. W. Sigourney, R. M. Hunt, Nevada City, Cal.

Galveston, Harrisburg & San Antonio.—Mr. W. G. Kingsbury has been appointed European Agent. He was formerly Immigration Agent of the International & Great Northern.

Terre Haute & Indianapolis.—Mr. John G. Williams is appointed General Solicitor, with office at Terre Haute, Ind., in place of Hon. R. W. Thompson, resigned to become Secretary of the Navy.

Kansas City, St. Louis & Chicago—This new company was recently organized by the election of the following directors: John W. Reid, Kansas City, Mo.; A. E. Asbury, Dover, Mo.; H. J. Higgins, Higginsville, Mo.; Thomas Shackelford, Glasgow, Mo.; D. H. Rea, Marshall, Mo.; John J. Mitchell, R. P. Tansey, John M. Woodson, St. Louis; George Strant, Peoria, Ill.; W. H. Mitchell, Chicago. The board elected John J. Mitchell, President; R. P. Tansey, Secretary.

Martha's Vineyard.—At the annual meeting recently the following directors were chosen: E. P. Carpenter, Joel Hills, Laban Pratt, J. K. Baker, N. M. Jernegan. The board elected E. P. Carpenter, President; Joseph F. Pease, Clerk and Treasurer.

St. Louis & San Francisco.—Mr. W. D. Griswold, of St. Louis, has been chosen a director and Vice-President and will take an active share in the management. Mr. Griswold was several years ago President of the Ohio & Mississippi.

Detroit, Monroe & Toledo.—At the annual meeting in Detroit, April 4, the following directors were chosen: Augustus Schell, E. D. Worcester, Amasa Stone, Jr., W. L. Scott, H. B. Payne, Charles Paine, G. B. Ely, C. P. Leland, Albert Keep, Philo Morehouse, John Newell. The road is leased to the Lake Shore & Michigan Southern.

James River & Kanawha Canal.—Mr. John W. Johnson has been chosen President, in place of C. S. Carrington, resigned.

Eastern.—Mr. C. M. Lewis has been appointed Master Mechanic, in place of Mr. John Thompson, resigned. Mr. Lewis was formerly for several years Master Mechanic of the Northern Central road.

Houston & Texas Central.—Mr. Abram Grosbeck, of Houston, Tex., has been chosen Vice-President, in place of Hon. W. R. Baker, resigned. Mr. Grosbeck has been a director from the first organization of the company.

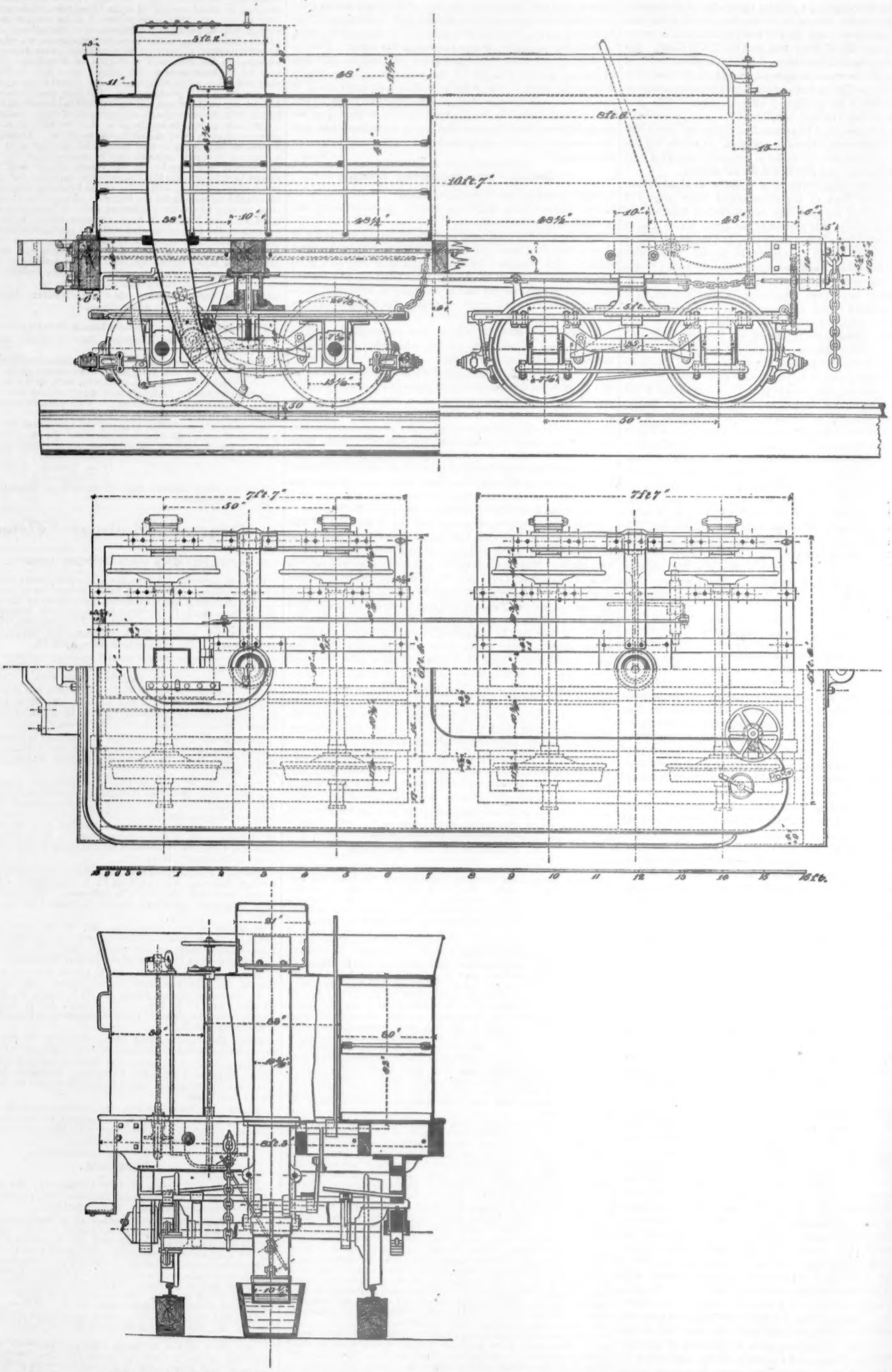
PERSONAL.

—Mr. James P. Kirkwood, Past President of the American Society of Civil Engineers, and eminent in his profession, died at his residence in Brooklyn, N. Y., April 22.

—Hon. A. B. Foster, well known as a large railroad contractor of Montreal, has failed for a large amount, and has resigned his position as a Senator of the Dominion of Canada. He is a Vermonter by birth and training and built the Vermont & Canada Railroad some 25 years ago, removing soon afterwards to Canada, where he built the Stanstead, Shefford & Chambly, part of the Grand Trunk and several other roads in the Province of Quebec. His latest undertaking is the Canada Central, in which he is said to have lost a great deal of money, and he had also, we believe, some contracts on the Canadian Pacific. His liabilities are stated at $2,500,000, much of it for rails bought in England.

—Robert Y. Hayne, of South Carolina, projector and first President of the Louisville, Cincinnati & Charleston Railroad Company, which built what is now the Columbia Branch of the South Carolina road, and who died nearly 40 years ago, is remembered by the officers of the Spartanburg & Asheville road, which occupies part of the line laid out by Mr. Hayne, they having named their first locomotive after him.

—Mr. Frank W. Gramont, Treasurer of the Providence & Springfield Railroad Company, died April 18 at Jacksonville, Fla., after a very short illness. Mr. Gramont was on a pleasure



LOCOMOTIVE TENDER FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

Reconstructed by Wm. Buchanan Master Mechanic.

trip to Florida in company with several friends from Providence.

—Major Alfred F. Sears, formerly of Newark, N. J., has been appointed Resident Engineer and Superintendent of the Chimbote Railroad in Peru. Major Sears has been in Peru for four years past, serving in the Government Corps of Engineers.

—Mr. C. W. Douglas, formerly Superintendent of the Delaware Division of the Erie and later of the South Side Railroad of Long Island, is reported to be about to visit Hayti in the interest of some New York parties who desire to build a railroad there to connect some mines with the sea coast.

—Gen. Wm. Mahone, President of the Atlantic, Mississippi & Ohio Company, is prominently mentioned as a candidate for Governor of Virginia. General Mahone is a very popular man, and the opposition to him appears to be chiefly local, any candidate from South-side Virginia being unacceptable to the Tide-water and Valley sections of the State.

—Mr. M. D. Wellman, formerly a large contractor and builder of a part of the Ohio Canal many years ago, died in Cleveland, O., April 17, aged 77 years. He was largely interested in iron property.

—Mr. Thaddeus Norris, Sr., formerly of the well-known firm of Norris & Co., locomotive builders, died recently of paralysis. He retired from business in 1861, and has since devoted his time to fishing and to the study of natural history, having written two books, "The American Angler" and "American Fish Culture," which are standard works on that subject.

—Mr. G. J. Forcacre, now General Manager of the Atlanta & Charlotte Air Line, was recently presented with a valuable silver service by the employes of the Virginia Midland, which road he left to take his present position.

—Mr. Adolph F. Ockershausen, a well-known and wealthy sugar refiner of New York, and a large stockholder and director of the Staten Island Railroad Company, died at his residence on Staten Island, April 24.

—Col. C. S. Carrington has resigned his position as President of the James River & Kanawha Canal Company, in consequence of differences of opinion as to the policy to be pursued in relation to the Clifton Forge Extension.

—Reports were recently in circulation of a large defalcation on the part of Charles F. Low, Secretary and Auditor, and S. L. Campbell, Paymaster, of the Marietta & Cincinnati Railroad. Late dispatches from Cincinnati state that these reports were very much exaggerated; there is a small discrepancy in Mr. Campbell's accounts, which is believed to result from careless book-keeping and which he offers to make good.

—Mr. James Sayre, an old and respected citizen and a director of the Utica & Black River Company from its formation, died at his residence in Utica, N. Y., April 22, aged 78 years. The board held a special meeting and passed appropriate resolutions.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending Dec. 31:

	1876.	1875.	Inc. or Dec.		P. c.
Huntingdon & Broad Top	$270,441	$322,830	Dec..	$52,389	16.2
Expenses	126,596	185,400	Dec..	58,804	31.7
Net earnings	$143,845	$137,430	Inc..	$6,415	4.7
Earnings per mile.	4,584	5,495	Dec..	911	16.2
Per cent. of exps..	48.90	57.43	Dec..	8.53	14.9
Philadelphia & Trenton	3,076,344	1,942,922	Inc..	1,133,422	58.3
Expenses	1,049,665	1,013,343	Inc..	36,322	3.6
Net earnings	$2,026 679	$929,579	Inc..	$1,097,100	118.0
Earnings per mile.	82,255	51,950	Inc..	30,305	58.3
Per cent. of exps..	34.12	52.15	Dec..	18.03	34.6
Santa Cruz	38,935	.....	.....	.....	....
Expenses	22,812	.....	.....	.....	....
Net earnings	$16,123	.....	.....	.....	....
Earnings per mile.	1,693	.....	.....	.....	....
Per cent. of exps..	58.64	.....	.....	.....	....

Three months ending March 31:

	1877.	1876.			
Philadelphia & Erie	$652,741	$705,128	Dec..	$52,387	7.4
Net earnings	186,711	194,010	Dec..	7,299	3.8
Per cent. of exps..	71.40	72.49	Dec..	1.09	1.5

Month of February:

Great Western, of Canada	$293,200	$313,400	Dec..	$20,200	6.4
Net earnings	33,400	62.000	Dec..	28,600	46.1
Per cent. of exps..	88.61	80.22	Inc..	8.39	10.5

Month of March:

Intercolonial	$84,453	$52,047	Inc..	$32,406	62.3
Paducah & Elizabethtown	28,727	.. ..	.....	.....	....
Philadelphia & Erie..	221,789	247,019	Dec..	25,220	10.2
Net earnings	62,177	.....	.....	.....	....
Per cent. of exps..	72.03	.....	.....	.....	....

Second week in April:

Atchison, Topeka & Santa Fe	$48,607	$58,681	Dec..	$10,074	17.2
Chicago, Milwaukee & St. Paul	119,000	134,800	Dec..	15,800	11.7
Denver & Rio Grande	12,113	.....	.....	.....	....

Week ending April 13:

Great Western, of Canada	$78,237	$79,756	Dec..	$1,518	1.9

Week ending April 14:

Grand Trunk	$185,622	$195,170	Dec..	$9,548	4.9

Coal Movement.

Coal tonnages reported for the week ending April 14 are:

	1877.	1876.	Inc. or Dec.	P. c.
Anthracite	434,249	409,640	Inc ..	24,609	6.0
Semi-bituminous	79,221	55,697	Inc ..	23,524	42.2
Bituminous, Pennsylvania	29,188	37,193	Dec..	8,005	21.5

Pennsylvania bituminous and semi-bituminous tonnages for the three months ending March 31, not heretofore reported, are:

	1877.	1876.	Inc. or Dec.	P. c.
East Broad Top	31,119	18,660	Inc ..	12,459	6.7
Bellefonte & Snow Shoe	12,841	15,007	Dec..	2,166	14.4
Allegheny Region	50,032	49,750	Inc ..	282	0.6
Penn and Westmoreland gas coal	205,393	160,722	Inc ..	44,671	27.8
Pittsburgh Region, rail	162,664	150,822	Inc ..	11,842	7.9

The coal tonnage of the Pennsylvania Railroad for the three months ending March 31 was:

	1877.	1876.	Increase.	P. c.
Anthracite	145,121	119,639	25,482	21.3
Semi-bituminous	409,032	329,094	79,938	24.3
Bituminous	418,089	361,294	56,795	15.7
Coke	239,552	182,724	56,828	31.1
Totals	1,211,794	992,751	219,043	22.1

The contract for the year's supply of coal for the Grand Trunk Railway at Portland and Montreal has gone to the mines at Pictou, Nova Scotia. The Pictou bids for the Portland delivery were the lowest, in spite of the duty of 75 cents per ton.

The Lehigh Valley Company has reduced the rate on coal on the Morris Canal to 45 cents per ton from Port Delaware to Jersey City. The boatmen say that at this rate they lose money on every trip and most of them have tied up their boats and quit work. They have not struck, but say they cannot earn enough to feed themselves and their horses, and that any one who wants to try it is welcome to take the boats. The company now offers to let the men have the boats at a merely nominal rental, and it is expected that most of them will return to work, as the reduction in rent will nearly offset that in freight rates.

RAILROAD EARNINGS IN MARCH.

Name of Road.	Mileage. 1877.	1876.	Inc.	Dec.	Per c.	Earnings. 1877.	1876.	Increase.	Decrease.	Per c.	Earnings per Mile. 1877.	1876.
Atchison, Topeka & Santa Fe	711	711	.....	.....	.....	$189,291	$180,247	$9,044	.....	5.0	$266	$254
Burlington, Cedar Rapids & Northern	401	401	.....	.....	.....	73,194	105,843	.....	$32,649	30.9	183	264
Cairo & St. Louis	146	146	.....	.....	.....	20,687	19,340	1,349	.....	6.9	142	133
Canada Southern	452	452	.....	.....	.....	153,682	165,431	.....	11,749	7.1	340	366
Central Pacific	1,634	1,315	319	.....	24.3	1,242,000	1,184,683	57,317	.....	4.8	760	901
Chicago & Alton	679	650	29	.....	4.5	346,308	355,527	.....	9,219	2.6	510	547
Chicago, Milwaukee & St. Paul	1,402	1,400	2	.....	0.1	469,000	567,643	.....	98,643	17.4	335	405
Cincinnati, Lafayette & Chicago	75	75	.....	.....	.....	23,120	30,203	.....	7,083	23.5	308	403
Cleveland, Mt. Vernon & Delaware	157	157	.....	.....	.....	29,376	29,566	.....	190	0.6	187	188
Denver & Rio Grande	269	120	149	.....	124.2	49,944	31,672	18,272	.....	57.6	186	264
Hannibal & St. Joseph	296	296	.....	.....	.....	160,000	174,300	.....	14,300	8.2	541	589
Illinois Central, Illinois lines	707	707	.....	.....	.....	373,034	417,081	.....	44,047	10.6	528	590
Indianapolis, Bloomington & Western	344	344	.....	.....	.....	90,474	103,513	.....	13,039	12.6	263	301
International & Great Northern	516	459	57	.....	12.4	116,000	95,523	20,477	.....	21.4	225	208
Louisville & Nashville	967	921	46	.....	5.0	412,983	374,117	38,866	.....	10.4	427	406
Louisville, Cincinnati & Lexington	208	208	.....	.....	.....	112,612	80,757	31,855	.....	39.4	541	388
Missouri, Kansas & Texas	786	786	.....	.....	.....	247,505	245,814	1,691	.....	0.7	315	313
Missouri Pacific	426	426	.....	.....	.....	326,079	304,953	21,126	.....	6.9	765	716
Nashville, Chattanooga & St. Louis	341	341	.....	.....	.....	139,576	145,980	.....	6,404	4.4	409	428
New Jersey Midland	86	86	.....	.....	.....	46,305	42,584	3,721	.....	8.7	538	493
Philadelphia & Erie	288	288	.....	.....	.....	221,789	247,019	.....	25,230	10.2	770	858
St. Louis, Alton & Terre Haute—Belleville Line	71	71	.....	.....	.....	43,223	42,239	984	.....	2.3	609	595
St. Louis, Iron Mountain & Southern	685	685	.....	.....	.....	350,000	299,038	50,962	.....	17.0	511	437
St. Louis & San Francisco	328	328	.....	.....	.....	108,182	102,639	5,543	.....	5.4	330	313
St. Louis & Southeastern	356	356	.....	.....	.....	81,306	85,331	.....	4,025	4.7	229	240
Toledo, Peoria & Warsaw	237	237	.....	.....	.....	84,220	102,739	.....	18,519	18 0	355	433
Wabash	628	628	.....	.....	.....	312,929	315,365	.....	2,436	0.8	498	502
Totals	13,196	12,594	602	.....	.....	$5,822,819	$5,849,147	$261,205	$287,533	.....	$441	$464
Total increase or decrease	.....	.....	602	.....	4.8	.....	.....	.....	26,328	0.5	.....	.....

RAILROAD EARNINGS, THREE MONTHS ENDING MARCH 31.

Name of Road.	Mileage. 1877.	1876.	In.	Dec	Per c.	Earnings. 1877.	1876.	Increase.	Decrease	P.c.	Earnings per mile. 1877.	1876.	Inc.	Dec.	P. c.
Atchison, Topeka & Santa Fe	711	656	55	....	8.4	$460,505	$441,796	$18,709	.....	4.2	$648	$673	.....	$25	3.7
Burlington, Cedar Rapids & Northern	401	401	....	....	.....	215,252	299,469	.....	$84,217	28.1	537	747	.....	210	28.1
Cairo & St. Louis	146	146	....	....	.....	60,964	60,010	954	.....	1.6	418	411	$6	.....	1.6
Canada Southern	452	452	....	....	.....	396,616	430,334	.....	33,718	7.8	877	952	.....	75	7.8
Central Pacific	1,634	1,315	319	....	24.3	3,318,000	3,196,226	121,774	.....	3.8	2,031	2,431	.....	400	16.5
Chicago & Alton	679	650	29	....	4.5	1,022,962	1,007,974	14,988	.....	1.5	1,505	1,551	.....	46	3.0
Chicago, Milwaukee & St. Paul	1,402	1,400	2	.. ..	0.1	1,249,460	1,612,301	.....	362,841	22.5	891	1,152	.....	261	22.7
Cincinnati, Lafayette & Chicago	75	75	....	.....	.....	69,875	102,433	.....	32,558	31.8	932	1,367	.....	435	31.8
Cleveland, Mt. Vernon & Delaw.	157	157	....	.....	.....	81,048	87,433	.....	6,387	7.3	516	557	.....	41	7.3
Denver & Rio Grande	269	120	149	....	124.2	135,140	95,859	39,281	.....	41.0	502	799	.....	297	37.1
Hannibal & St. Joseph	296	296	....	....	.....	418,800	473,300	.....	54,500	11.5	1,415	1,600	.....	185	11.5
Illinois Central, Illinois lines	707	707	....	....	.....	1,112,939	1,295,004	.....	182,065	14.1	1,574	1,832	.....	258	14.1
Indianapolis, Bloom. & West'n	344	344	....	....	.....	275,818	379,548	.....	103,730	27.3	802	1,103	.....	301	27.3
International & Gt. Northern	516	459	57	....	12.4	428,013	352,045	75,968	.....	21.6	829	767	62	.....	8.1
Louisville, Cincinnati & Lex	208	208	....	....	.....	278,255	242,869	35,386	.....	14.6	1,338	1,168	170	.....	14.6
Missouri, Kansas & Texas	786	786	....	....	.....	719,845	756,996	.....	37,151	4.9	916	963	.....	47	4.9
Missouri Pacific	426	426	....	....	.....	852,327	900,223	.....	47,896	5.3	2,001	2,113	.....	112	5.3
Nashville, Chattanooga & St. L.	341	341	....	....	.....	438,536	481,188	.. ..	42,652	8.9	1,286	1,411	.....	125	8.9
New Jersey Midland	86	86	....	....	.....	139,140	126,743	12,397	.....	9.8	1,618	1,474	144	.....	9.8
Philadelphia & Erie	288	288	....	....	.....	652,741	705,128	.....	52,387	7.4	2,266	2,448	.....	182	7.4
St. Louis, Alton & Terre Haute, Belleville Line	71	71	....	....	.....	131,469	120,814	10,655	.....	8.8	1,852	1,702	150	.....	8.8
St. Louis, Iron Mt. & Southern	685	685	....	....	.....	1,079,610	938,344	141,266	.....	15.1	1,576	1,370	206	.....	15.1
St. Louis, Kansas City & North'n	530	519	11	....	2.1	751,358	805,184	.....	53,826	6.7	1,418	1,551	.....	133	8.6
St. Louis & San Francisco	328	328	....	....	.....	314,718	310,293	4,425	.....	1.4	960	946	14	.....	1.4
St. Louis & Southeastern	356	356	....	....	.....	262,327	249,822	2,505	.. ..	1.0	709	702	7	.....	1.0
Toledo, Peoria & Warsaw	237	237	....	....	.....	243,370	314,205	.....	70,835	22.5	1,027	1,326	.....	299	22.5
Wabash	628	628	....	....	.....	942,473	989,023	.....	46,550	4.7	1,501	1,575	.....	74	4.7
Totals	12,759	12,137	622	....	.....	16,041,559	16,774,564	$478,308	1,211,313	.....	$1,257	$1,381	.....	$124	9.0
Total increase or decrease	.....	.....	622	....	5.1	.....	.....	.....	733,005	4.4	.....	.....	.....	.....	.....

Petroleum Movement.

The shipments of crude petroleum from the Pennsylvania oil regions for March were 912,603 barrels, and for the three months ending March 31, 2,105,058 barrels, against 1,757,784 barrels in 1876, and 1,516,983 barrels in 1875.

East-Bound Rates.

The tariff of April 9 from Chicago was modified April 18 by making the rates from Chicago to Albany, Troy and Schenectady five cents lower than the Chicago-New York, instead of the same. On the 21st a considerable advance was made on live stock and meats, bringing the live-stock rates nearly up to the basis which had been pretty steadily maintained for a long while until about a year ago. The rates now are:

Chicago to—	Live stock.	Bulk meats.	Boxed meats.
New York	55	50	45
Boston	60	55	50
Albany	50	45	..
Buffalo	..	32½	..
Cleveland	..	..	25

The increase from Chicago to New York is 5 cents on cattle and sheep and 10 cents on hogs. That on meats, 10 cents.

The differences in favor of Philadelphia and Baltimore are 2 and 3 cents per hundred, respectively, the same as for all other freight.

THE SCRAP HEAP.

Rodes' Water Lift.

A trial was recently made, with successful results it is said, of an arrangement for raising water, invented by Mr. Tyree Rodes, of Giles County, Tenn. The trial was made on the Louisville & Nashville road and was witnessed by a number of its officers. The arrangement is thus described by the Nashville *American:*

"He uses Heald & Sisco's centrifugal pump—the power applied by wire-rope running gear, from the celebrated Roebling's wire-rope works, whose proprietors furnished the loan of the gearing without charge. An endless ¾-inch wire cable, several hundred yards in length, works in two large grooved fly-wheels—one attached to the shaft which turns the pump machinery, and the other at the other end of the rope, several hundred yards distant along the track. The locomotive stops at the water-tank, and while the water is flowing from it into the tender, the engine-driver attaches to the cable a powerful clamp which is permanently secured to the locomotive. The locomotive moves off with a little extra speed for a few hundred yards, and its pull upon the rope sets the wheels revolving with great rapidity—the water rises instantly through an eight-inch pipe to the height of fifty feet, and by the time the end of the rope is reached by the locomotive, the pump has replaced in the stationary tank exactly the amount of water that was run out of it into the locomotive tank. As the locomotive approaches the end of the wire-rope, the extended clamp from the engine encounters an upright beam placed permanently beside the track at a given distance from the pump, and the contact acts upon the clamp on the principle of a trigger, instantly releasing the clamp and dropping the rope, and that stops the pump until another train comes along, when the process is repeated by the succeeding locomotive, so that each preceding locomotive pumps water into the stationary tank for its successor, without loss of time or expenditure. There is no fuel, nor stationary engine, nor man to attend it required. The engine driver or the stoker simply attaches the locomotive clamp or grappler to the rope at the time when the water is flowing into the tender, and he has no more care with it. The clamp detaches itself and releases the rope at the required distance, by contact with the upright above mentioned, and the locomotive moves on the even tenor of its way, like a thing of life, with the proud consciousness of having done its duty to its neighbor locomotive as it would be done by.

"For the successful operation of the water-lift it is not imperative that it should be located directly along the track. The rope-gearing is a distance annihilator—that is for any reasonable distance."

Government Contracts.

Proposals will be received until May 22 for dredging 20,000 cubic yards, more or less, through the bar and in the channel of the harbor of Cedar Keys, Fla. Printed forms, specifications, etc., can be had on application to Capt. A. N. Damrell, United States Engineers, at No. 40 Church street, Mobile, Ala.

Proposals will be received for the iron work of a movable dam on the Great Kanawha River, West Virginia. Forms, specifications, etc., can be had on application to Major W. P. Craighill, at the United States Engineer office in Baltimore.

Proposals will be received until May 15 for building five locks on the Muscle Shoals Canal, Tennessee River, near Florence, Ala. Forms, specifications, etc., can be obtained from Capt. W. R. King, United States Engineers, at Chattanooga, Tenn.

The Eastern Railroad Association Experiments.

The dynagraph car of the Eastern Railroad Association has finished its work on the Boston & Albany and is going to the Boston & Lowell, where a series of experiments are to be made to determine the train resistances and the work done by the locomotives on that road.

Tender for Hudson River Railroad Locomotive.

Our full-page engraving this week represents the tender, with arrangement for taking up water while running, or "jerk-water," as the men on the road call it, used with the locomotive which was illustrated in the two preceding numbers of the *Railroad Gazette.* There is little that can be said about the engraving of the tender which is not better told by the engraving itself.

RAILROAD GAZETTE

Published Every Friday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

CONTENTS:

Editorial Announcements.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

THE PROSPECT FOR PROFITABLE BUSINESS.

Within a few weeks past, and culminating within the last week, there has been a downward movement in the prices of most railroad securities, including the stocks which have stood the test of years as solid, dividend-paying properties, and even extending to the bonds of corporations not suspected of insolvency. This is at a time when money is a drug in the market, loaned "on call" in New York at from 2 to 4 per cent., and loaned on time when Government bonds are pledged as security at 3 per cent., while mercantile paper brings 4 to 5 per cent., and some borrowers get still easier terms. Abroad there is the same oversupply of money—the rate of discount at Paris and London being 2 per cent. And still in New York last Saturday and Monday stocks which have paid 10 per cent. yearly for ten years, and have stable, growing, lightly incumbered properties behind them, sold for 96; 8 per cent. stocks with a similar record for 84 to 89, and in Philadelphia last Monday Pennsylvania Railroad stock which paid 10 per cent. for many years, and since 1874 has only dropped to 8 per cent. sold down to 60½ cents on the dollar. This year is not yet four months old, and yet since it opened the prices of some of the best investment stocks have fallen by such percentages as these, comparing the highest prices with the lowest of Monday last: Chicago, Burlington & Quincy, 18½; Chicago, Rock Island & Pacific, 20; New York Central & Hudson River, 18; Panama, 36; Pennsylvania, 38. This great fall in prices is not due to extraordinarily high prices early in the year. On the contrary, the highest prices of this year in every case are lower and in most cases much lower than the highest prices of 1876, as will be seen below:

Stock.	Price April 23.	1877 Highest.	1877 Lowest.	1876 Highest.	1876 Lowest.
C., B. & Q.	96	118¾	94	121¾	112½
C., R. I. & P.	82¼	102¾	82¼	111⅝	98¾
N. Y. Cen. & H. R.	85¼	104¾	85¼	117½	96
Panama	83¾	130	80	140	122
Penna.	60⅜	97¼	60⅜	107¼	

In the case of the Panama Railroad, there have been special reasons for a decline; but all of the above stocks have paid dividends for many years, the Panama 12 per cent., the Chicago, Burlington & Quincy 10 per cent., and the others 8 per cent., and no great misfortune is known to have befallen them. The depression in price, if corresponding to a depression in value, must be due to general causes, first made known or appreciated during the past three or four months. It is true that speculators for a fall have actively exerted themselves to depress prices, and doubtless they have been able to do a great deal by artificial means. But a bear movement in dividend-paying stocks like these must proceed by different methods from those ordinarily pursued with speculative stocks—or rather something must be added to those methods—to make it thoroughly successful. These stocks are chiefly held by investors who expect to get an income from them, and are not likely to sell except to better themselves—to get a security which is safer or pays better. To cause a free selling movement it is necessary to frighten investors. When money can be borrowed at 4 or 5 per cent. a man does not sell 8 per cent. stocks for 60 to 85, or 10 per cent. stocks at 96, unless he has great doubts as to the continuance of the dividends. The price paid for Pennsylvania stock last Monday is about what a 4½ per cent. stock of good standing would be likely to bring. At that price the stock would be a good investment (paying 7½ per cent. compound on the cost) should the company suspend dividends for seven years to come, provided it resumed and maintained 8 per cent. thereafter. If New York Central is worth 110 in ordinary times when it is expected to pay 8 per cent. dividends (and it usually brings considerably more in such times), then to justify the price of 85 for which some was sold last Monday, its future dividends should be 6¼ per cent.—not for one or two years only, but constantly, without recovery. Should it pass dividends for three and a half years, and then resume at the present rate, at this price it would still be as good an investment as an 8 per cent. stock at 110. Of course the market must take account of people's fears, and one does not pay 100 even for a 10 per cent. investment if he thinks he can get it a little later for less. But this is the question: what has made such an impression upon the minds of investors that at a time when they find it very difficult to loan money for 5 per cent. they are willing to sell stocks at prices which make them yield 9, 9¾, 10½ and 13½ per cent. with such dividends as they have paid throughout the past years of great depression of business, extraordinarily low rates, and prolonged and bitter competitive contests? We shall not pretend to answer this question, but will endeavor to examine into the immediate prospects for railroad business, and compare the present condition of things with that of last year.

The confidence of the public is affected by the general course of railroad business. The failure of one line or system of lines causes suspicion as to the soundness of most other lines, provided there is not some patent exceptional cause for the failure, and sometimes when there is. Thus the bankruptcy of the numerous new lines was followed by distrust of the older ones for some time; and still more the reduction and passing of dividends on old investment stocks has caused holders to fear that their turn might come next. The case of the new roads was not similar. Because an enterprise should fail which never had paid it was not logical to infer that hitherto profitable enterprises must lose their profits or any part of them. But when there is a decline in the profits of the Michigan Central, it is reasonable to fear that there may be something similar on the Lake Shore or the Fort Wayne, and if Pennsylvania drops from 10 to 8, without increase of capital, then it will not be strange if New York Central and Baltimore & Ohio also have some decrease in their profits. Now there have been since 1873 a great number of failures to pay interest on bonds, chiefly by new roads which never paid dividends or earned much more than their interest, but the changes in dividend payments have been less than may be supposed. In New England most of the larger roads which have heretofore paid 10 per cent., last year dropped to 8 or 9, and several others have reduced the rate of dividend slightly, but the whole amount of decrease has not been great. In New York the Rome, Watertown & Ogdensburg, which paid 7 per cent. in 1873, has passed dividends since July, 1875, but there have been no other considerable changes. In New Jersey and Pennsylvania we have had the tremendous collapse of the anthracite coal carriers, which suspends dividends on $115,000,000 of stock which lately paid 10 per cent., and reduces them on about $25,000,000 more, besides causing default in interest payments on many millions of bonds. This is the one great catastrophe to railroad dividends since the panic—a terrible one, and calculated to cause distrust, but plainly referable to a common cause, and not by any means so recent that its effect could be only now fully felt. Besides this we have the reduction in the rate of dividend on the Pennsylvania Railroad from 10 to 8 per cent., and the disappearance of the Oil Creek & Allegheny River from the list of dividend-paying roads. Further west the Great Western of Canada, wholly an English property, has been unable to earn dividends since 1874 and the Michigan Central since 1873. The Lake Shore & Michigan Southern, which had paid 8 per cent., has dropped to 3½ and 4 per cent. The two latter have a large capital and were favorite investments, but their misfortunes came long enough ago to have had full effect before this year. The Cleveland, Columbus, Cincinnati & Indianapolis has reduced the payments on its small capital, but there have not been any other considerable changes in Ohio, which has not many dividend-paying roads.

On the Chicago system of railroads, the chief changes are the passing of nearly all dividends by the Chicago & Northwestern, which, however, never paid regular dividends, though it has sometimes paid large ones; the reduction (in 1874, we believe,) from 10 to 8 per cent. by the Chicago & Alton, and by the Illinois Central first from 10 to 8 and last year from 8 to 6. The Burlington road maintains its 10 per cent. and the Rock Island its 8 per cent. dividends. The Chicago, Milwaukee & St. Paul has paid less since 1873 than before, doubtless, but not much less, and more last year than for two years previous. This almost closes the list of Western roads that paid dividends in 1873. It must be remembered that by far the greater part of the lines in that part of the country never earned anything for their stockholders. The Hannibal & St. Joseph, which once was profitable, had ceased to pay dividends as early as 1870. The St. Louis roads paid none in 1873, and have very rarely paid any, except those of the Missouri Pacific paid as rental for a while by the Atlantic & Pacific. The Toledo, Wabash & Western had great expectations, but it never paid dividends except on $1,000,000 of preferred stock. If we turn to the Southern roads, we find that they in very few cases recovered sufficiently to pay dividends after the war. Some of those which did have since suspended or reduced their dividends, but the aggregate amount is not large, and moreover the fluctuations of Southern stocks have scarcely any effect on the market for railroad securities in the North. Against the reductions, we have the appearance of the Union Pacific since 1873 as a company paying 8 per cent. on $26,000,000, and the Central Pacific earning an equal amount of profits, though it is not always divided. Aside from the anthracite roads, as nearly as we can ascertain, the dividends have been passed since 1873 on less than $100,000,000 of capital stock, against which must be set the beginning of payments on $26,000,000 Union Pacific stock. There has been in addition a large reduction on $50,000,000 of Lake Shore stock and some other shares, and small reductions on a larger amount.

This does not appear to be an alarming condition of things. Aside from the coal roads, there has been, we believe, during a year past no suspension of dividends by roads with large capital—nothing to indicate that one after another the companies will drop from the list of dividend-paying roads, unless it may be some reductions in the amount of dividends. Has anything occurred to indicate that the current year will be an unusually unfavorable one for the dividend-paying roads, that production will be reduced, traffic be diminished, or rates for carrying be reduced?

So far as agricultural productions are concerned, the year 1876 gave us the largest cotton movement on record and a crop but little smaller than the largest, one of the largest corn crops, only a tolerable wheat crop. The number of hogs and cattle marketed was very large. Moreover, petroleum, one of our chief exports, and a leading freight on several dividend-paying roads, was produced more plentifully than ever before. The decrease in the production of anthracite coal was considerable, but would have had little effect but for the great fall in the price of that fuel. For the current year, so far, there is some decrease in the grain movement compared with last year, but it still remains good; the cotton movement is nearly equal to that of the previous year, when it was the largest ever known; the petroleum movement is larger than ever before; the anthracite coal movement is larger by five-eighths than for the same time last year, and has been at a rate which, if continued (which is not probable, however, for want of a market), will give this year the largest production ever known; the promise for this season's crops is fair enough; the prices of grain are the highest for a long time, and the European war is likely to make an unusually active market for grain and provisions only partly counterbalanced by a diminished demand for cotton. The manufacturing and other industries of the country are certainly not in a satisfactory condition, but they are probably quite as active and remunerative as at this time last year. Altogether there is every prospect that there will be at least the usual movement of freight this year, and a strong probability that the grain movement will be unusually active.

Passenger traffic, in all probability, will be decidedly light, and very much smaller than last year, when the Centennial not only caused many journeys solely on its account, but also caused journeys to be made in 1876 which otherwise would have been later or earlier.

But of late years the earnings of railroads have been more affected by the rates received than by the amount of traffic. Rates have fallen steadily from year to year, while usually freight traffic has increased, often very largely. To a certain extent reductions have been necessary, as otherwise the traffic would not have been secured; but almost the only large traffic of which this is true is that in grain,

which will not move freely except at low rates *when prices are low*. But by far the greater part of the reductions have been due to a lack of harmony among the companies, which have often carried for less than cost a large part of the traffic for which they compete. In 1875 there was such an artificial reduction of rates for several months; in 1876 a still greater reduction for two-thirds of the year on the trunk lines and many of their connections. The prospect for rates is one of the most important elements for basing a judgment on the prospect for profits and dividends. Now this is a matter concerning which we cannot be certain, but certainly there has not been for years so good a prospect for harmony among the competing lines; the trunk lines have made an agreement which they all profess to be satisfied with. They agree as to its interpretation; they are working under it harmoniously; the rates agreed upon under it do not arrest the movement of freight. Moreover, the natural causes which usually compel the acceptance of very low rates for grain are not likely to have so great an effect this season as for the two past. Prices of grain are high, and it will bear a remunerative rate for transportation, which is likely to be secured throughout the season unless there is a superabundant supply of vessels on the lakes; but even if the trunk lines make no profit on the summer grain movement, we must remember that there is besides grain a large traffic in provisions, etc., which is little affected by the competition of the water-route, and the Northwestern roads do not suffer much by low grain rates from Chicago to the East. Moreover, though passenger traffic is light, rates are more remunerative than for two years past, on the trunk lines, and except on the lines which had very large Centennial receipts, the profits on that business may easily be as great as they were last year.

The returns made of earnings so far this year are not very encouraging when compared with those of last year; but we must remember that during the first quarter of 1876, railroad business was unusually good, the earnings of the roads reporting being no less than 11½ per cent. greater than in 1875. But the whole number of roads reporting is so small, and their earnings vary so greatly—some showing very large increases and others very large decreases—that it is not safe to draw general conclusions from them. Few of the dividend-paying roads report monthly.

It does not seem, therefore, that any great calamity has occurred or is threatened to railroads, aside from the anthracite lines, which makes it probable that their profits will be cut off hereafter, or will be less than last year, while there is at least a possibility that they will be considerably greater. If there is a fair grain crop in the Northwest and present prices continue, several railroads there will be able to increase their profits very largely, and the prosperity of Northwestern farmers will do much to revive the manufacturing industries of the country, so that there is at least a chance that there will be a considerable improvement in railroad business generally.

It would seem, then, that the disposition of holders to sacrifice all railroad investment stocks is not justified by the actual position of affairs; that the great and unexpected calamity of the coal roads has led investors to distrust other lines which are affected favorably rather than otherwise by the fall in the price of coal, and that the bear speculators have taken advantage of this exaggerated distrust to reap their harvest. They are reported to have the market pretty well in their own control, and are supposed to have encouraged the advances since Monday in order to secure their profits more perfectly, as it is the profits and not the stocks that they want; and it is quite possible that the effect of their operations will be felt in the market for some time to come.

Down East.

One of the first matters observed, during a recent hasty journey through New England, was the frequent blowing of the locomotive whistle on the railroad between New York and New Haven. By actual count it was blown ninety-eight times between these points, or in a distance of 74 miles. A law of the State of Connecticut requires railroad companies to have the engine whistle blown at every road crossing. This becomes an intolerable nuisance to passengers, especially in summer time, when the car windows are open, and in the drawing-room cars which are run at the front of the trains. That all this noise is quite unnecessary has been shown on some of the roads running out of Boston, where the use of the whistle has been almost or entirely abandoned, excepting as a danger signal, the ringing of the bell being found quite sufficient to warn persons at the crossings. The Railroad Commissioners of the State of Connecticut might, it is thought, properly take up this subject and determine whether it would not be best to recommend the repeal of a law which makes so great an annoyance as the perpetual blowing of a locomotive whistle becomes.

NEW HAVEN.

A marked change has occurred during the last few years in the appearance of things to a stranger on arriving in the City of Elms. In years past the traveler was received there with a dismal scowl by the darkness of the old underground depot, which was the happy hunting ground of pickpockets and thieves. Now a new, large, cheerful and comfortable station building receives the wayfarer, who is favored by a breath of sea air—if the wind is in the right direction—from the salt water close to which the new building is located. The latter is farther west than the old depot and is near the shops of the railroad company.

The engine department of the latter is under the charge of Mr. Kittendorf, Master Mechanic, and the car department under Mr. Denver, the Master Car-Builder. These shops are somewhat noted for the neatness and good order in which they are always kept. Instead of the usual litter and general confusion found around railroad shops, everything is in complete order and looks as though the management was business-like and not wasteful, which latter is the painful impression so often produced by the appearance of things at other shops.

There is little new to report of these shops. General dullness reigns; economy is the order of the day. Comparatively few men are employed, and they are engaged on repair work only.

It may be worth noting that the old engine which went through the bridge in the terrible Norwalk disaster about twenty-five years ago has just been rebuilt. The engine has been so much repaired that now there is little or nothing left of the original machine.

Mr. Kittendorf has used a great many steel-tired wheels for engine and tender trucks. The success of these has been—well we will not anticipate a report which we hope to get and which will give a correct record of their performance.

A peculiarity about the engines on the New Haven road is the length of their smoke-boxes. These are extended forward to about double the usual length, and have a wire netting inside which acts as a spark arrester. Just above the tubes a sheet-iron deflector is attached to the tube plate and projects forward and downward a distance of about 15 or 18 inches. From this a wire netting is attached, which extends forward and upward to the front end of the smoke-box, so that all the smoke, etc., must pass through the netting before it can escape through the chimney. The latter is what is called a "plain stack," that is, a simple pipe without a spark arrester of any kind. The projecting smoke-box is a very ungainly-looking object, although it is said to give good results.

At the New Haven car-shops Mr. Leighton is building two of his patent sleeping cars for the Wagner Sleeping Car Company. It would be difficult to describe the construction of these so that the description would be understood without elaborate engravings. They are so arranged, however, that the weight of the upper berths and the bedding is all carried in or near the floor. This of course diminishes the amount of top-heaviness of the car. Seven cars of this description are running on the road from Lynchburg to Memphis.

The Mansfield Frog Company also reports dullness. Few orders for new work and only a few men employed, who are engaged on repairs. The Mansfield elastic frog, as many of our readers know, is made with the rails resting on wrought-iron plates, between which oak planks are inserted to give some elasticity to it.

HARTFORD.

In the railroad shops at Hartford there is not much to report, excepting to commend the safety-chains which Mr. Perry is putting on his car-trucks. The chains were not intended for ornament—as some car-builders seem to assume they are—but are put on so as to hold the trucks in case they should get off the track. In these days, when so much care is given to making bridges secure, it would be well if a little mathematics were devoted to the strength of the safety-chains, and especially to their attachments. The best bridge floor in the world would not make the structure secure against accident if a car-truck should get off the track on the approach to the bridge, and should then "slew" around so as to get crosswise of the track. A wreck is then inevitable; whereas if the safety-chains should hold the truck in line with effective guard timbers or rails, a car would run all the way across a bridge, on a properly-constructed floor, without doing any material damage. Quite recently an engine truck got off the rails on the Portage Bridge on the Erie Railway, which is 235 feet high and 820 feet long, and ran half way across without doing any damage. The truck was securely held in line by the safety-chains and the guard timbers.

One of the most interesting places in Hartford, to a railroad man, is the shop of the Pratt & Whitney Company. This company has just expended a large amount of money in special tools and machinery for manufacturing taps and dies on a large scale, and of the greatest possible accuracy of size and form. They are making the Franklin Institute or Sellers system of threads a specialty, and their tools are expressly designed for that purpose. They are also manufacturing what are called Whitworth standard gauges. A very interesting essay might be written to describe the appliances which they are using in order to secure the greatest possible precision in the manufacture of both the gauges and the taps and dies. Any master mechanic who will visit their shops will be convinced, as the writer was, that although it is not impossible for a railroad company to compete with them in the manufacture of these tools, it will at least be so difficult that there is no probability whatever that any company will be able to equal them in either the accuracy or the cost of the work. For some reason, neither master mechanics nor master car-builders, seem to realize at all the importance of good workmanship in the manufacture of screws. If it were possible for every one of them in the country to visit these shops, and take some lessons in the manufacture of screws, it would be the most profitable time they ever spent, both for themselves and for the companies by which they are employed. Any company which has not yet adopted the Sellers system of threads should, before doing so, examine the admirable methods which the Pratt & Whitney Company have devised to produce tools of almost absolute accuracy, and also to maintain a uniform degree of precision. Those master mechanics who are manufacturing their own taps and dies should make a special journey to Hartford to see how much better the Pratt & Whitney Company are doing it than is possible in any ordinary railroad shop.

Generally business is dull in Hartford, as elsewhere. The company referred to builds light machinery chiefly, such as special tools for sewing machine and gun shops. The latter business has not yet felt the effects of the declaration of war in Europe, but it is expected that it will in case the war should continue.

Unfortunately the only opportunity which presented itself to call on James L. Howard & Company was at dinner time. The members of this firm, it seems, are as prompt in observing the demands of a good appetite as they are in business affairs, so that there was no chance for an interview.

SPRINGFIELD.

At Springfield Mr. Dudley's experimental car was found on a side track, and had aroused no little interest in the minds of the natives to know precisely what he proposed to do. He has been engaged in making experiments for the Eastern Railroad Association, the results of which are not yet ready for the public. The inside of this car—which, by the way, was originally a baggage car of the Baltimore & Ohio Railroad—looks like an old-fashioned alchemist's—we forget what they called them—crypt is a good word, however, and sounds like what is meant. The car contains a number of mysterious-looking instruments intended for various purposes, chief among which is Mr. Dudley's "dynagraph" for determining the resistance of trains, a machine for testing the tensile strength of metals, and another for testing their hardness, besides books, tools, etc.

The many friends of Mr. Eddy will learn with pleasure of his welfare, that he is in good health and spirits and as ready as ever to argue in favor of small steam ports for locomotives instead of large ones, of perforated dry-pipes instead of steam domes, of wide fire-boxes instead of narrow ones, and more than all that a big boiler is better than a little one. The results of the experiments made with one of his engines and a mogul engine on the eastern end of the Boston & Albany Railroad, which have never been published, were, we learned, confirmatory of those made on the western end, and which showed a decided advantage for the engine designed by Mr. Eddy. The following dimensions of one of his latest passenger engines may be of interest to some readers: Driving wheels, 6 feet diameter; 18×24 in. cylinders; steam ports, 1¼×12 in.; throw of eccentrics, 5¾ in. Owing to the shortness of the link, the valve does not get the full throw of the eccentrics, which is perhaps not important. The valves have 1 in. lap outside and $\frac{1}{16}$ lead inside. The barrel of the boiler is 50 in. diameter outside, made of steel ⅜ thick and double riveted all through. The grates are 54 in. long and 41¼ wide, instead of 35½, which is the ordinary width. The outside shell of fire box is made of ½ in. steel. On each side of the fire box are 22 hollow stay bolts with ⅝ in. holes. The engines have injectors only and no pumps. Mr. Eddy announces that hereafter he will not use any pumps on new engines. The great width of grate is secured by using a flat bar for the frame between the driving-wheels, which permits the fire-box to be widened about six inches. The recent freight engines built by Mr. Eddy have 18×26 in. cylinders and 4½ ft. driving wheels, the boiler being the same as that for passenger engines. The throw of eccentrics is 5 in., with ¾ in. outside lap of valve and $\frac{1}{16}$ in. lead on the inside.

In the car department of the Boston & Albany Railroad there is very little to report, excepting that Mr. Adams, the Master Car-Builder, was found very comfortably established in a new office, at least in one which was new to his visitor. He gives the same report as comes from all other car-builders—dull business and demands for economy.

Mr. Stearns, Master Mechanic of the Connecticut River Railroad, has been using several Magoon feed-water heaters. He reports considerable saving of fuel from their use.

At the Wason Car Manufacturing Company, things also look very quiet. They have very nearly completed the second drawing-room car for the Galveston, Harrisburg & San Antonio Railroad. These cars are finished on the inside in a new and very tasteful style. All the paneling and mouldings, instead of being curved, are straight, with the corners of the mouldings chamfered off. In its general character it resembles what has come to be called the "Eastlake" style. Both the panels and mouldings are made of mahogany of different shades. All the joints of the inside finish are covered, and the mouldings are fastened with screws so that they can be removed. The car body is 52 feet long over the sills and 9 ft. 8 in. wide, with one end open. That is, one end of the car body is left open so that a partition across the car leaves an open compartment eight feet long. As the cars on this line are always turned around, the open end is practicable. At the other end of the car there is a state-room, closet, porter's closet and steam heater. The latter is made by the Van Horn Steam-Heating Company of New Haven. The windows have 45×36 in. glass and are counterweighted. In the lower part of the sash are five holes 1 in. in diameter to be used as ventilators. They are provided with a sliding cover with which they may be either opened or closed. The cars have a strong four-wheeled truck with Westinghouse brake and Miller platform and coupler. The rear platform is railed in with a very ingenious arrangement of gate and cover for enclosing the steps. The trucks are hung on screw hangers and rest on double iron transoms on the car body, which are connected together by two longitudinal iron trusses, against which the side bearings rest. The outside of the car is painted wine color, but if the ornamental painter had been restrained somewhat the effect might have been better. Some of the scroll work is perfectly torrid in its luxuriance. The finish of the inside of the car is a new departure in American car construction. The general style has long since been carried out in the design and construction of furniture. Perhaps it should not be surprising that decorators of American cars should not be able at once to lay aside their habits of ornamentation, and that in making such a change they should use paint and gilding when the simple woodwork would have been better without.

The design of the inside finish of the car is, however, very good and a great improvement on the stereotyped panels which have done service so long. There is no obvious reason why there should not be as great a variety in the design of railroad cars as there is in that of houses or furniture, excepting that there are more houses and furniture than cars; but there is certainly opportunity for the exercise of a great degree of taste and invention in the design of cars than is indicated by those which have been built during the past decade. The Wason Car Company has made a very successful effort in this direction.

The manufacture of car wheels is now an important portion of the business of this company. It is casting them by a new method patented by the Superintendent of their establishment, and which will be described more fully hereafter. It is now preparing to make 42 in. wheels which now seem to be regarded with much favor by railroad men in New England.

BOSTON.

In Boston the same monotonous report of dullness is heard everywhere. The Hinkley Locomotive Works are finishing up some "stock engines," that is, engines that are not sold. They have several large mogul and American engines on hand of 4 ft. 8½ in. gauge. Some of these are completed and others nearly so. They also have orders for several *two-feet* gauge engines for a road in Massachusetts. The designs are very neat and give promise of an excellent engine. The projectors of this road adopted the idea of having what the ladies would call a *real* narrow-gauge road. The passenger cars are to be built with a centre aisle and with single seats on each side which will be much more comfortable than the seats supplied in cars for three-feet gauge roads.

In the railroad shops some preparation is being made for the summer travel, which generally increases very largely on the New England roads on the approach of warm weather. The Boston & Providence road has contracted for five new passenger cars, one baggage, one smoking and postal car. It has in use two iron-crate platform cars, and also two ordinary platform cars of iron. The bodies or rather framing of these cars are made of channel iron similar to an iron tender frame. It is an experiment in the use of iron cars which will help to decide the much discussed question.

Mr. Richards, of the Providence road, has had in use several pairs of 33 in. cast-iron turned wheels. One pair of these, which were turned before putting under a smoking car, ran 55,926 miles. These then required turning and will again be put into service. The other pair have run 72,540 miles and are still in use. There are also in use on this road sixteen "Bochum" solid steel wheels under tenders. Four of these had run up to April 1 102,056 miles without turning and are still in very good condition.

In comparison with this we may take, however, four cast-iron wheels, also used under tenders, which have run 96,593 miles and are still in use. It is of course apparent that to draw any correct inferences a larger average of service must be taken.

Those of our readers who are members of the Master Mechanics' Association will hear with regret that the President, Mr. H. M. Britton, will be unable to attend the annual convention next month, as his duties as Superintendent of the New York & New England Railroad will not permit him to leave at that time.

PROVIDENCE.

At Providence the Rhode Island Locomotive Works are in very much the same condition as the Hinkley Works at Boston. Comparatively few men are at work, no orders are coming in, and dullness reigns. Mr. Durgin, the Superintendent, has recently designed and built several ten-wheeled locomotives with long fire-boxes of the Belpaire "system." In this the top of the fire-box shell is flat and the crown-sheet is stayed with stay-bolts from the shell without crown bars. Both the crown-sheet and the outside shell are slightly sloped towards the back. Mr. Durgin is also at work on several other modifications of our locomotive practice which are not yet fully developed.

The Browne & Sharpe shops are running chiefly on sewing-machine work, their tool business having fallen off very largely, owing to the general dullness. It is gratifying, however, to know that the demand for their instruments and tools of precision, as they may be called, had steadily increased up to 1873. In the shops of the Browne & Sharpe Company one may see almost the poetry of mechanism. Any one accustomed to the large and comparatively rude work of engines and cars can hardly realize the exactness with which really good sewing-machine work is done. Thousandths of an inch are talked of as if they indicated inaccuracies of unpardonable magnitude, and instruments are used with which the length of a journal may be measured and that dimension indicated as readily as a sixteenth of an inch on an ordinary rule.

From Providence our journey was homeward by the Stonington line of steamers.

Generally, the verdict must be that business "down East" is very dull; it has not improved, but business and railroad men seem to think that future prospects are a little better.

Technical Conventions.

Annual conventions of railroad and engineering associations will be held as follows:

The American Railway Master Mechanics' Association, at St. Louis, Tuesday, May 15.

The Master Car-Builders' Association, at Cleveland, Wednesday, June 13.

THE ERIE RECONSTRUCTION SCHEME is said by *Herapath's Journal* of April 14 to be making good progress. On the 10th inst. the total of the bonds assenting to the scheme was about $29,500,000, and the amount of share assessments paid in was reported as amounting to $1,350,000. *Herapath* says, "The success of the scheme is now as well assured as anything can be that is not completely done." Other London papers, however, express doubts of its success and virtually advise against the payment of assessments on the stock.

Railroads in Australia.

At the close of 1876, according to letter to a German paper from a resident of Australia, the colony of South Australia had 300⅗ miles of steam railroads and 71 miles of horse railroads, the latter being long lines and not city railroads. One horse railroad 25 miles long, and one steam railroad 7 miles long, are private roads; the rest belong to the Government. The steam roads are:

Adelaide to Port Adelaide	9½ miles
Adelaide, Gawler, Kapunda & Burra	124 "
Port Wakefield & Blyth's Plains	43 "
Port Wakefield & Wallaroo	34½ "
Port Pirie & Gladstone	32½ "
Lacepede Bay & Naracorte	51 "
Adelaide & Glenelg (private)	7 "
Total steam	300⅗ miles

And the following are the horse roads:

Strathalbyn, Goolwa & Port Victor	32 miles
Port Broughton	14 "
Kadina, Wallaroo & Moonta (private)	25 "
Total horse roads	71 miles

The colony had a population of only 216,848 souls last June, and it has incurred a debt of about $7,300,000 for its government roads (which are not quite completed) and has authorized a further loan of $11,000,000 to complete these roads and construct or begin the construction of about 400 miles more. The Port Pirie & Gladstone road, which was completed last December, has cost about $35,000 per mile. It is of 3 ft. 6 in. gauge, which is that adopted for all the new Government roads, we believe, except such as form extensions of the older 5 ft. 3 in. roads.

In New South Wales, at the end of 1876, there were 484 miles of railroad completed, and 202½ under construction. These roads have cost an average of about $77,000 per mile. The average earnings were nearly $12,500 per year (about one-half greater than the average earnings of United States railroads), and the average expenses $8,600. This colony has appropriated about $10,000,000 for the construction of 265 miles more. Nearly all the railroads in this colony are of 4 ft. 8½ in. gauge, but one completed last year, 45 miles long, is of 5 ft. 3 in., to connect with a road of that gauge in the colony of Victoria, adjoining. This road with equipment cost $13,000 per mile.

The colony of Victoria had 699 miles of Government railroads completed at the close of 1876, 100 miles having been opened within the year; and at the same time 276 miles were in progress. These roads are of 5 ft. 3 in. gauge. Those constructed recently have cost from $12,000 to $25,000 a mile.

On the average, the railroads completed at the end of 1875 had cost $35,000 per mile in Victoria, $84,000 in New South Wales, $90,000 in Queensland, and $30,000 in New Zealand. It is only recently that cheap railroads have been built.

At the end of June, 1876, the colony of Queensland had 282 miles of railroad completed, and 150 in course of construction.

West Australia, in 1876, had 38 miles of railroad, and work had been begun on 33 miles more.

In Tasmania (formerly Van Diemen's Land), there are now 150 miles of Government railroads and 5⅓ of private roads. They are of 3 ft. 6 in. gauge. The Government has refused to accept the chief line from the contractors, its engineers reporting that it is dangerous to run over.

In New Zealand in July, 1876, 549 miles of railroad were in operation, 382 under contract, and 99 were located and to be let. They are of 3 ft. 6 in. gauge. Thus we have a total in Australia as follows:

South Australia	300⅗ miles
New South Wales	484 "
Victoria	699 "
Queensland	282 "
West Australia	38 "
Tasmania	155⅓ "
New Zealand	549 "
Total	2,508 "

New Zealand, which is about as far from Australia as the Bermudas are from New York, is not properly included under the head of Australia, but it is in the same quarter of the globe at least, and with a similar population and government. It is perhaps the most promising of all the British colonies in the Pacific, so far as agriculture is concerned, and has a moist climate and exuberant vegetation which have caused it to be called the England of the Southern hemisphere.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Cincinnati & Eastern.—Extended from Williamsburg, O., eastward to Mt. Oreb, 7 miles. It is of 3 ft. gauge.

Joplin.—Extended from Baker, Mo., east by south 13 miles.

Henderson & Overton.—Extended southeast 11 miles to Henderson, Tex., completing the road.

Corpus Christi, San Diego & Rio Grande.—Extended west 6 miles to Oso River, Tex. It is of 3 ft. gauge.

This is a total of 37 miles of new railroad.

LAKE SUPERIOR ORE has a closer relation to transportation business than most people suspect. Aside from the traffic which it affords the Lake Superior railroads—the Marquette, Houghton & Ontonagon and the Peninsula Division of the Chicago & Northwestern—which is their chief support, and that which it contributes to the railroads from Lake Erie to the blast furnaces in the Mahoning valley, about Pittsburgh, etc., which is important—besides these contributions to local traffic, the Lake Superior ore forms one of the leading staples of lake traffic and gives employment to a considerable proportion of the lake marine. As the number of lake vessels of late years has been in excess of the demand, their competition with each other has forced down prices for all lake freights; of these only the grain is shared to any considerable extent by the railroads; but the competition of the vessels has been the chief cause of the very low rail rates on grain of the past two years from the West to the East. Anything outside of rail freight that gives employment for the vessels, therefore, tends to diminish the competition and to permit the collection of more remunerative rates on grain. The other chief freights of lake vessels are lumber and Lake Superior ore. Anthracite coal, which is the chief freight westward, need hardly be taken into consideration, as it does not add to the tonnage required, never being sufficient to load all the vessels going west for grain. It is, therefore, encouraging to learn that the ore traffic is good and promises to improve. A very great improvement took place last year, when the shipments were 15 per cent. greater than in 1875, amounting in the aggregate to 921,438 tons, about one-half from Marquette, two-fifths from Escanaba (whence the shipments from the Northwestern road are made), and the rest from L'Anse. The course of the shipments of this ore for four years has been:

1873	1,187,270
1874	936,488
1875	766,373
1876	921,438

Thus apparently there has been a turn in the production. It is reported that the prospect is favorable for a still greater increase this year, so that the total shipments are likely to approximate or equal those of 1873, the year of greatest production. This is in the face of the great dullness of iron business generally. Two causes have worked in favor of the Lake Superior ores: one the rapid growth of the Bessemer steel manufacture, which requires an iron as free from phosphorus as that afforded by Lake Superior ore, and the other the fact that the necessary reduction in the price of ores has still left the Lake Superior miners with some profit, while at many other mines expenses equal or exceed the prices obtained.

In weight, last year's shipments of ore from Lake Superior were equivalent to about 37,000,000 bushels of corn, or to 55 per cent. of the total movement of the grain by lake that year. An increase to the figures of 1873 would be nearly equivalent to an addition of 12,000,000 bushels to the lake grain movement.

MARCH EARNINGS are given in our table from 27 railroads with 13,196 miles of road, or more than one-sixth of the mileage in operation in the United States. These roads, having 4.8 per cent. greater mileage than last year, earned ¼ per cent. less, and the decrease in earnings per mile is 5 per cent.—from $464 to $441. Thirteen of the companies show an increase and 14 a decrease. The large increases are 57.6 per cent. on the Denver & Rio Grande (due to greater mileage), 21.4 per cent. on the International & Great Northern, 39.4 on the Louisville, Cincinnati & Lexington, and 17 per cent. on the St. Louis, Iron Mountain & Southern. The large decreases are 30.9 per cent. on the Burlington, Cedar Rapids & Northern, 17.4 on the Chicago, Milwaukee & St. Paul, 23.5 on the Cincinnati, Lafayette & Chicago, 10.6 on the Illinois lines of the Illinois Central, 12.6 on the Indianapolis, Bloomington & Western, 10.2 on the Philadelphia & Erie, and 18 per cent. on the Toledo, Peoria & Warsaw.

For the first quarter of the year 27 roads report, 26 being the same as those reporting for March, but the Louisville & Nashville, which reports for March, is not included in the list for the quarter, and the St. Louis, Kansas City & Northern is in the list for the quarter but not in the March list. These 27 roads have 12,759 miles, or nearly one-sixth of the total, and 5.1 per cent. more than last year. With this increased mileage they have earned 4.4 per cent. less than for the corresponding quarter of 1876, which, however, was a very favorable one. The decrease in earnings per mile is 9 per cent.—from $1,381 to $1,257. The March earnings per mile were 35 per cent. of those for the quarter in 1877 and 33⅜ per cent. in 1876.

In our table last year, the lines reporting, including nearly all in this year's table, showed an *increase* in earnings per mile of 11⅓ per cent. over 1875, when the average was $1,244. Compared with this latter figure this year's earnings for the quarter show an increase of 1 per cent.

HENRY MEIGGS, the Peruvian railroad contractor, who has been probably the largest foreign purchaser of American railroad material and the largest employer of American engineers also, has this month resumed work on some of the unfinished lines on which work has been suspended for some time for lack of money, under a contract which gives him control of the great Cerro de Pasco mines, which since the Spanish conquest are said to have yielded $500,000,000 in silver, but have been substantially abandoned for some time because of the cost of working at the depth attained, where it was almost impossible to bring heavy machinery, and drainage is indispensable. Mr. Meiggs not only intends to make the mines more accessible by a railroad, but to excavate a drainage tunnel; and it is claimed that this is likely to expose to easy working as much ore as has already been taken out from the mine. The Government is to receive from 30 to 50 per cent. of the yearly net product of the mine, according to the amount taken out. Mr. Meiggs is to obtain the capital for the new works, the Government guaranteeing interest and appropriating guano to secure it. Capital is not likely to be easily obtained on these terms, and Mr. Meiggs begins by issuing $1,250,000 of his own circulating notes to provide for the opening of the work. In the company formed by Mr. Meiggs there are besides himself Messrs. John L. Thorndike, Charles S. Rand, James H. Sherman, Minor K. Meiggs and W. H. Cilley, some of whom are well known to American engineers. Some of Mr. Meiggs' former employes have been recalled from America for this new work, but it is not likely to require, at present at least, anything like his former force of engineers.

THE CHICAGO GRAIN FLEET, all of which will probably sail this week, is described in the *Inter-Ocean* as consisting of 89 vessels, loaded with 1,907,469 bushels of grain. This amount would make 5,375 full car-loads, and 179 trains of 30 cars each.

So loaded in cars it would make an unbroken line of 95 miles long. The largest load reported is 79,998 bushels of corn, on the schooner "G. W. Adams," and this alone is equivalent to 224 car loads. Seven of the vessels are steamers, two barges, and the other fifty all schooners. If all the vessels had the capacity of the "G. W. Adams," they could have taken 4,700,000

bushels instead of 1,900,000, the actual average cargo being 32,200 bushels. The rates received are generally 3 cents per bushel to Buffalo for corn and 3½ cents for wheat, but a recent charter for wheat from Milwaukee is reported to have been taken at 5 cents.

TERMINAL GRAIN CHARGES have been the subject of negotiations during the past week between the representatives of the railroad companies and the Produce Exchange, the object being to equalize the charges at Baltimore, Philadelphia and New York. The plan recommended was, substantially, to adopt the Baltimore practice, and to charge 1¼ cents a bushel on all grain for delivery and 10 days' storage, whether the delivery be by lighters or by the New York Central elevator. The proposition was favorably received by the Exchange and will probably be adopted and go into effect May 1.

THE FRESH BEEF EXPORTS continue to increase at a rapid rate, and promise eventually to afford a profitable market for a materially greater production of cattle in this country, for which there is abundance of room; and to give constant employment to a considerable amount of rolling stock. The exports from New York in March were 5,797,817 lbs., which is nearly as much as the total for the first half of 1876, and 45 per cent. more than in February or any other month. Since the first shipments were made in October, 1875, 29,600,000 lbs. have been exported from New York, and more than two-fifths of it within the past three months.

General Railroad News.

THE SCRAP HEAP.

Railroad Manufactures.

The Missouri Car & Foundry Co., at East St. Louis, is building 100 box cars for the Lafayette, Muncie & Bloomington Company. They are to be put into the White Line.

Messrs. Clark, Reeves & Co. desire to correct the statement, which was telegraphed from Cincinnati and copied by us last week, that the Tennessee River bridge, on the Cincinnati Southern, was awarded to them, but that they subsequently declined to sign the contract. The contract, they state, was not awarded to them.

The creditors of the Birmingham (Conn.) Iron & Steel Works met recently and decided to begin proceedings in bankruptcy.

The Pottstown (Pa.) Iron Co.'s rolling mill is running on plate iron for ship building.

The Baugh Steam Forge Co., of Detroit, Mich., is having an 8-inch and a 16-inch merchant bar mill made in Pittsburgh.

The Akron (O.) Iron Co. proposes to move its blast furnace and rolling mill to a point near Gore in the Hocking Valley region.

The week before last the steel-rail mill of the Lackawanna Iron & Steel Co., at Scranton, Pa., made 1,377.18 tons of steel rails. The rails made were 50 lbs. to the yard in 30-feet lengths. The number of rails was 6,173, rolled in 11 turns, the best single turn making 740 and the best double turn 1,414 rails.

The *Iron Age* reports for the week ending April 17, in Philadelphia, sales of 10,000 tons of steel rails at about $49 per ton at the mills.

The Monocacy Furnace Co., at Monocacy, Berks County, Pa., has made an assignment for the benefit of its creditors.

Quinnimont Furnace, at Quinnimont, W. Va., went into blast April 2.

The Pittsburgh Forge & Iron Co. is running its works full double turn.

The Pittsburgh & McKeesport Car & Locomotive Works, at McKeesport, Pa., are now running ten hours per day, after three months' work on eight hours.

At the annual meeting of the St. Albans Iron & Steel Co., in St. Albans, Vt., last week, the old board of directors was re-elected. The meeting was not very harmonious, however, and some of the stockholders questioned the managers very sharply. It was plainly charged in the course of the debate that some of the directors had been making money at the expense of the company. Resolutions were passed instructing the board to use increased economy in the management.

The Harrisburg Car Co., at Harrisburg, Pa., has 400 men at work, and is building a number of cars, including some special cars for Barnum's show.

The Chestnut Hill Iron Co. has some 12,000 tons of pig iron piled up in its yard at Columbia, Pa., and is said to have refused a recent offer of $18 per ton for a large lot, preferring to keep the iron.

A corporation known as the Buckingham Company has been organized at Columbus, O., for the purpose of working coal and iron mines in Salt Lick and Monroe townships in Perry County, O., and of building a blast furnace, rolling mill, etc. The company also intends to build tracks to connect its mines with the Ohio Central road.

The Franconia Iron Co. is running its works at Wareham, Mass., full time.

The Agawam Iron Mills, at East Wareham, Mass., which have been idle a long time, have been leased by E. Robinson & Co., of Boston, who will make plate iron.

The New Albany (Ind.) Rolling Mill is temporarily stopped for repairs, two of the rollers in the rail mill having broken.

The Buffalo, New York & Philadelphia Railroad Company has recently had one of Wythe's speed recorders put in each caboose car in use on the road.

Out of 42 blast furnaces (39 of them charcoal furnaces) supplies exclusively with Lake Superior ore (all but three in Michigan), only 7 are in blast; and of 22 furnaces in the Upper Peninsula (19 charcoal furnaces), only two, both charcoal furnaces, are in blast; and still the consumption of Lake Superior ore has increased, the explanation being that less charcoal iron than formerly is required, the Bessemer works now taking very little, but using pig smelted with anthracite and bituminous coal from Lake Superior and similar ores.

The Cawood Swage Block Cases.

The United States Supreme Court has reached a decision in the suits brought by Mr. Turrill, owner of the patent, against several companies for infringing the patent of Cawood for a swage-block for repairing the ends of iron rails. In the cases of the Chicago & Alton, the Chicago, Burlington & Quincy and the Pittsburgh, Ft. Wayne & Chicago the Supreme Court finds infringement and affirms the decision of the Circuit Court. In the cases of the Illinois Central and the Lake Shore & Michigan Southern the Circuit Court decision is reversed.

The Great Blast.

The great blast at the Port Henry Iron Co.'s Mine No. 21 last week was partly successful, two of the great pillars of ore being pretty well broken up and about 50,000 tons of ore thrown down. The charges in the third pillar failed to explode at the time, and it was thought that the temperature in the deep holes was too low. A subsequent attempt, made a few days later, was more successful, and the third pillar was then thrown down.

Tramps.

The Susquehanna (Pa.) *Journal* of recent date says: "A freight train on the Erie, on Monday last, had in it two flat cars, on each of which was a huge stationary engine boiler, shipped from Jersey City to San Francisco. When near Waverly, engineer Squires, on looking back, discovered passengers about the cars who hadn't properly engaged transportation, and when the train stopped the employes made an inspection of the aforesaid boilers. On opening the furnace doors out crawled from the two fire-boxes *twenty* grimy tramps. When told that those boilers were not Queen Victoria palace coaches, and that they couldn't go any farther on that train, they appeared quite crestfallen. One, however, confidentially remarked that they were 'bound for California in them b'ilers, somehow.' A close watch was kept and the whole troupe was obliged to stop at Waverly."

Large Steel Rail Production—A Challenge.

The Scranton (Pa.) *Republican* of April 16 says: "Last week the steel rail mill of the Lackawanna Iron & Coal Co., at Scranton, Pa., in the usual eleven turns, on a 50-pound rail 30 feet long, did the following work, which is considered one of the most extraordinary on record:

Total number rails rolled	6,173
Average per turn	561
Total tonnage during week	1,377.18
Average time rolling each bar during entire week, including all stops during and between turns	77 secs.
Best single turn rails	740
Best double turn rails	1,414

"Actual rolling time of above, consecutive, 1,414 bars, 23 hours, 43 seconds; average, 60⅜ seconds per bar; 1,414 bars equal 4 miles and 90 feet of track; greatest speed accomplished, 109 bars in 97 minutes, a little less than 53½ seconds per bar; 6,173 rails will lay 17 miles, 2,835 feet of track.

"On the above figures the officers and men of the mill make the following claims and challenge comparison:

"First—To have rolled the largest number of rails yet rolled in the world on one rail train in one week.

"Second—To have made the largest tonnage ever made on equally light rail in one week.

"Third—To have rolled the largest number of rails yet rolled in twelve hours.

"Fourth—The same claim as to twenty-four hours.

"Taking the above as an average the company, using both its mills, could roll rails for a double track to Pittsburgh, a distance of 480 miles, in 27 weeks. This enormous amount of work turned out at No. 2 mill seems all the more when we compare it with that done at No. 1 mill on iron, now having the same capacity as No. 2, when the first D., L. & W. track was being laid. The distance from Scranton to Great Bend is 52 miles, and it took the mill already mentioned nearly six months to roll the rails necessary, which could now be supplied in three weeks."

OLD AND NEW ROADS.

Cincinnati Southern.

A meeting was held in Cincinnati, April 18, at which a number of prominent citizens were present, to consider the question of operating this road. Several statements were made as to the condition of the road, the finished work and the amount needed to complete the line, also the amount needed to begin operations on the completed section. The meeting resolved to organize a company to lease, complete and operate the road, and appointed a committee to make the necessary preliminary arrangements.

On April 20 an excursion train was run from Cincinnati to the Kentucky River bridge with a number of city officers and invited guests, Gov. McCreery and a delegation from Kentucky being taken up on the road. At the end of the run there was a collation and speeches were made by several of the visitors, and the company were given an opportunity of seeing the official tests of the great bridge over the Kentucky before returning to Cincinnati.

The tests of the bridge are thus described by the Cincinnati *Enquirer:* "The test consisted of the running of engines and heavily loaded cars on to different portions, and careful observation, by instruments, of the result. Eighteen civil engineers were employed in the test. On the first test four engines, flanked by two cars, were run on to the north span and allowed to stand ten minutes. The enormous weight thus placed on this span amounted to 632,000 pounds. The second consisted of the same applied to the middle span, and the third of the same put upon the centre of the south span. The fourth consisted of two engines and seven loaded cars run on to the north and south spans, with the main weight directly above the hinge, while the fifth and sixth were the same except that there were four engines and five loaded cars. The seventh and last was the most interesting. An engine weighing 122,000 pounds and 24 loaded cars weighing 40,000 pounds each, being run on to the bridge at the rate of 20 miles an hour, and suddenly stopped near the centre. The shock was tremendous, but the structure stood the test nobly, the result being entirely satisfactory to the builders and Trustees. The deflection of the end spans on the first and second trestle was 2½ inches, that of the middle span 3 inches, the horizontal deflection of the piers 1¼ inches, settling back to ¾ before the train was removed, and the longitudinal motion at the ends of the bridge ⅝ inch at each end. The greatest motion at the connection joint was about ¾ inch."

Cincinnati, Sandusky & Cleveland.

At Toledo, April 20, the Circuit Court ordered that the injunction and order appointing J. D. Lea Receiver be dissolved and the road restored to the company. The Court in its decision was very severe upon the conduct of the whole matter, holding that the order appointing the Receiver had been improperly obtained; that there was no evidence of any necessity for such a proceeding; there was no evidence of mismanagement, no default in interest and no movement to change the management among any of the stockholders except Sloane. The application for the receivership was made by T. M. Sloane, son of Rush R. Sloane. The opinion of the Court, as published in the Cincinnati *Enquirer*, says:

"Who is this T. M. Sloane? He is a young man, the son of Rush R. Sloane, who was former President of the road and was made manager, with supreme control of its affairs. In 1873 it was made evident that he was found guilty of unparalleled rascality, and was indicted, not only for embezzlement, but for forgery, and that he fled the country. He is now here. How does the son become possessed of this stock? The evidence shows that 69 shares were transferred from father to son; the other 40 shares were purchased by Rush R. Sloane and transferred to his son. * *

"It is claimed that the present Receiver is an honest man, and who would work for the interest of the stockholders; but up to this date he has worked only for Rush R. Sloane. It would seem, under these circumstances, that if he meant to act as a Receiver he ought not to have imposed upon them by putting the most obnoxious of all men at the head of the management. It was undoubtedly prearranged. Lea for Receiver, with Sloane as General Manager to back him in everything.

"If the frauds complained of are true, Rush R. Sloane is liable as much as Farlow, and should be a defendant to the suit. But he is not made a party. If the suit were really presented for the benefit of the stockholders, they would have coupled Sloane's name with others. Hence we say that the whole scheme is made in the interest of R. R. Sloane, to put him in possession of that road; and it remains to be seen whether any court in this State will sanction such a proceeding.

"The plaintiff does not claim that the dividend on preferred stock has not been paid, but it is said that the common stock will be depreciated, and that he would become personally liable to the stockholders. We hardly think that that is sufficient grounds for the appointment of a Receiver. These bonds of which plaintiff speaks, which he holds, he claims will be rendered useless, and he will be without remedy. There is no interest due, nor has the principal been demanded. So this must be but a pretence to justify the appointment of a Receiver.

"Then it is said there is a general mismanagement of the road—the rolling stock run down, that the road is out of repair, and the track broken up, etc. On this question the State Inspector says that the road is in better condition than it was at the time Sloane had control. But, supposing that the stocks have depreciated in the market, is that a reason why a Receiver should be appointed? * *

"It is said that there were $465,000 of bonds improperly issued, which were appropriated by Farlow and Price. This is utterly denied, and there is no proof to sustain the allegation. Now Sloane comes into court and asks for the appointment of a Receiver for the protection of the stockholders from frauds which he was committing. We think that the development of facts shows the appointment of a Receiver unwarranted and the order of injunction uncalled for, and that simple justice requires that we should vacate the Receivership and dissolve the injunction, and the court so orders."

Subsequently the Sloane party appealed from this decision and gave the necessary appeal bond. It is said that the appeal cannot be tried until May, 1878, owing to the manner in which the sessions of the court are arranged. The latest dispatch says: "Mr. J. D. Lea, Receiver of the road, having declined to transfer the property of the company to the old management, in accordance with the recent order of the court, has been cited to appear at Toledo, April 25, before the Judges who rendered the late decision vacating the receivership, and show cause why he disobeyed their orders. This action will bring up the question of appeal, and will probably reopen the whole case."

Rochester & State Line.

It is said that negotiations are nearly completed for an agreement which will settle finally all the points in dispute between the contractor and other parties interested in this road. It is thought that everything can be arranged and work resumed in a few days.

Pennsylvania.

The Philadelphia stockbrokers, imitating their brethren in New York, have been making a persistent effort to run down Pennsylvania stock, and have succeeded in forcing it down to the lowest point ever reached. On April 21 it was quoted in Philadelphia at 30¼ (being 60½ per cent. of the par value), having fallen about four points. The stock subsequently recovered to 36⅛, or 73 per cent. of the par value.

The guaranteed stocks of several of the company's leased lines also went down from 5 to 15 per cent., the heaviest fall being in United New Jersey and Cleveland & Pittsburgh, the former chiefly dealt in in Philadelphia and the latter in New York.

New York, New Haven & Hartford.

The high wooden bridge at Cos Cob, Conn., was destroyed by fire on the night of April 24, causing some delay to trains and making a transfer necessary until a temporary bridge can be put up.

James River & Kanawha Canal.

At a meeting held in Richmond, Va., April 24, the stockholders passed resolutions in favor of an active prosecution of work on the Buchanan & Clifton Forge Railroad, which is to connect the canal with the Chesapeake & Ohio Railroad.

Erie.

Receiver Jewett's report for February is as follows:

Balance, Feb. 1	$299,745 70
Receipts from all sources	2,250,616 17
Total	$2,550,361 87
Disbursements for the month	2,066,913 70
Balance, March 1	$483,448 17

The receipts exceeded the disbursements by $183,702.47. There were $441,436.10 Receiver's certificates issued during the month; the amount of these certificates outstanding March 1 was $2,075,115.80.

Niagara Suspension Bridge.

The second commission to examine this bridge consisted of Messrs. W. H. Paine, Assistant Engineer of the East River Bridge; Charles Macdonald, President of the Delaware Bridge Co., and T. C. Clarke, of Clarke, Reeves & Co. Of their inspection the Suspension Bridge *Journal* of last week says:

"The engineers selected to make a new examination of the Great Railway Suspension Bridge at this place arrived on Tuesday last. They were met on the Canada side by Mr. Hobson, Chief Engineer of the Great Western Railway, and other officials, as also the directors of the bridge company. By the concurrent request of both parties, the Commission proceeded to examine the bridge in all its parts systematically, occupying Tuesday afternoon, Wednesday and Thursday. Every part of the work was gone over thoroughly. * *

"On yesterday the engineers made a formal test of the bridge by filling it from tower to tower with heavily laden freight cars, the actual weight of which was 450 tons. The result was entirely satisfactory. A still more trying test was an informal one made on Wednesday night, when 36 loaded freight cars and four empties broke loose in the Central yards and ran across the bridge at the rate of 15 miles an hour."

This examination resulted in a report so satisfactory that passenger traffic over the bridge has been resumed.

Mobile & Ohio.

The Committee of Reorganization give notice that the holders of $5,247,920 first-mortgage, $1,539,000 Tennessee substitution, $873,736 second-mortgage and $412,500 convertible bonds have assented to the agreement of reorganization, making $8,073,156 out of a total of $11,492,127. An amicable reorganization has been prevented by the opposition of some of the bondholders, and it is thought that a sale will be necessary. This contingency is provided for by the agreement, and as the committee now hold a sufficient amount of bonds to secure all the advantages of the agreement, they have fixed the limit of time when holders may sign the agreement and deposit their bonds at May 15, after which none will be received.

Central, of New Jersey.

The Lehigh Coal & Navigation Company has begun suit in the Pennsylvania Court of Common Pleas, asking that the Receiver of the Central be directed to pay over the rental due on the Lehigh & Susquehanna road, or, in default of such pay-

ment, to surrender the property. There will probably be no dispute as to the facts in the case, the only contest being over the legal points involved, the principal one being whether a lessor corporation is entitled to the usual legal remedies for default in rental when the lessee is in the hands of a receiver. This is a point of considerable importance, especially at the present time.

Montreal, Portland & Boston.

Work has been resumed on this road and the company expects to have the section from Montreal to West Farnham, P. Q., completed by June. When that is done it is said that work will be begun on the extension of the road from Marieville to a connection with the Portland & Ogdensburg at Sheldon, Vt.

Quebec, Montreal, Ottawa & Occidental.

It is said that the Quebec Government has decided to build the Quebec-Montreal line only to Terrebonne, 12 miles from Montreal, making the connection into the city over the Western Branch of the same road. This will increase the distance between Quebec and Montreal about 12 miles. This action is taken in consequence of the refusal of the Montreal City Council to pay over the balance of the city's $1,000,000 subscription to the old North Shore Company, which was to be transferred to the Provincial Government.

Atlantic & North Carolina.

This company has applied to the North Carolina Supreme Court for an order to set aside the appointment of a receiver by the Circuit Court, and the case will come up soon. An application for the removal of the present Receiver and the appointment of some other person was made to the Circuit Court last week and set for hearing May 3.

A correspondent of the Raleigh *News* says: "A non-resident mortgage bondholder, it is said, will ask Judge Bond, at the Circuit Court in Raleigh, in June, for a foreclosure of mortgage, and the appointment of a receiver in the meantime.

"A New York holder of North Carolina State bonds issued to aid the construction of the Atlantic & North Carolina Railroad, which bonds pledge the earnings and the stock in the road for their payment, has begun an action to sequestrate the net earnings of the road, praying to have so much of the stock sold as will satisfy the accrued interest on his bonds, and asking for a receiver in the meantime. This action is also in the Circuit Court at Raleigh, and is precisely such a suit as was begun by Swazey against the North Carolina Railroad some years ago, with the results of which your readers are familiar. In that suit the Circuit Court ordered the payment of the dividends arising on the State's interest to be paid to the holders of bonds of the State, called construction bonds. Sam. F. Phillips, Esq., was appointed Receiver, and at a subsequent term of the court, Chief Justice Waite presiding, a decree was entered ordering the sale of so much of the State's stock in the North Carolina Railroad as would satisfy the accrued interest on bonds of the State issued to aid the construction of the road."

Marquette, Houghton & Ontonagon.

The Michigan Legislature has passed a joint resolution extending until 1880 the time for the completion of this line from Marquette to Houghton.

Meetings.

Meetings will be held as follows:

New York & Harlem, annual meeting, at the Grand Central Depot, New York, May 15, at noon.

Central Vermont, annual meeting, at the office in St. Albans, Vt., May 16, at noon.

Flushing, North Shore & Central, annual meeting, at the office, No. 113 Broadway, New York, May 7, at noon.

St. Louis, Alton & Terre Haute, annual meeting, at the office in St. Louis, June 4, at 3 p. m.

Chicago, Iowa & Nebraska, annual meeting, in Clinton, Ia., May 15.

Missouri, Iowa & Nebraska.

This company has begun a new attempt to secure subscriptions along the line for the extension of the road from its present terminus at Centerville, Ia., westward to the Missouri River. Several county subscriptions were voted some years ago and are said to be still good.

Wallace Branch.

It is proposed to build a road from Port Wallace, N. S., on Northumberland Straits, southward to the Intercolonial at Giles Valley and thence past the Londonderry iron mines to Spencer's Point on the Basin of Minas, about 30 miles in all. The Provincial Government is asked to help.

Kansas City, Memphis & Mobile.

Arrangements have been made to organize a new company, and to begin work at once on the completion of the graded section of this road. A considerable amount has been subscribed to the stock in Kansas City.

Joplin.

The track on this road is now laid to a point five miles from Joplin, Mo., and 33 miles east by south from the western terminus at Girard, Kan. Trains run to the end of the track, and the rails are being laid steadily towards Joplin.

Cincinnati & Eastern.

On April 18 this road was opened for travel to Mt. Oreb, Brown County, Ohio, seven miles east of the late terminus at Williamsburg and 31 miles from the junction with the Little Miami at Newtown.

Keokuk, Iowa City & Minnesota.

The graded and unfinished road-bed of this company was sold recently under foreclosure and bought by Wm. Timberman, trustee, for $60,000. It is expected that it will be transferred to the lately organized Keokuk & Northwestern company.

Henderson & Overton.

The track of this road is now all laid from the International & Great Northern at Overton, Tex., southeast to the old town of Henderson. The road is 16 miles long and has been built chiefly by local subscriptions.

Corpus Christi, San Diego & Rio Grande.

Track is now laid to the Oso River, 11 miles westward from Corpus Christi, Tex. Work is still progressing, and the company expects to finish 40 miles this year. There are now one engine and 12 cars on the road.

Cleveland & Newburg.

This road is ordered to be sold under foreclosure of mortgage by the Ohio Court of Common Pleas. It is a short line of 3½ miles, from Cleveland, O., to Newburg, built entirely for suburban travel. The date of the sale is not yet fixed.

California Pacific.

The grading of the extension of the Vaca Valley Branch from Winter's, Cal., to Madison is now completed, and the tracklayers are at work, although there are still several bridges to be completed.

Colorado Central.

Denver papers report that the pending law suits between the present management of this company and the Union Pacific have been settled by mutual compromise.

The company is now making arrangements for the extension of the Floyd Hill Branch to Georgetown, 19 miles; and expects to build as far as Idaho Springs this summer. It also expects to begin work soon on the extension of the Main Line from Black Hawk to Central City.

Lehigh Valley.

This company recently reduced the wages of all its employes, except the locomotive engineers, 10 per cent. The employes in the repair shops have appointed a committee to represent to the officers of the company that their wages were already very low and that this last reduction makes it almost impossible for them to support their families.

Kansas City, St. Louis & Chicago.

A company by this name has been organized to build a line from Kansas City, Mo., eastward to Mexico, about 150 miles. The capital stock is fixed at $2,400,000. The line proposed runs south of the Missouri to a point near Glasgow where it crosses and runs nearly due east to Mexico. The list of directors includes several persons connected with the Chicago & Alton Company, and it is understood that the organization is in the interest of that company and to complete its Missouri Division to Kansas City.

Burlington, Cedar Rapids & Northern.

Hassler's *Circular* says: "This road offers for sale at 90, $150,000 bonds on the line of the Minneapolis & St. Louis Railroad, from Albert Lea to the State Line, a distance of about 12 miles, the interest on which is guaranteed by the B., C. R. & N."

Great Western, of Canada.

A report telegraphed from London to the effect that all arrangements were completed for an "amalgamation" of this company and the Grand Trunk met with an emphatic contradiction from the officers of the Great Western in Canada.

The final examination of the Niagara Bridge having been completed, General Manager Broughton has issued the following order:

"The inspection of the Suspension Bridge across the Niagara River, of which notice has been given to the public, having been completed by three eminent engineers who unanimously recommend the resumption of passenger traffic, this company gives notice that on and after the 25th April instant their passenger trains will again be run via the Suspension Bridge."

Northern Pacific.

The branch from Tacoma, Wash. Ter., to the Puyallup coal fields is now graded to the Carbon River, 22 miles from Tacoma, and tracklaying has been begun. There are 210 white men, 400 Chinamen and a steam pile-driver at work on the branch, and the work is being pushed.

Car Accountants' Association.

The second annual meeting of this association was held in Indianapolis, April 18, there being present 49 members, representing as many railroad and fast freight lines. Mr. G. W. Jones, of the Pennsylvania Railroad, was chosen Chairman; F. M. Luce, Chicago & Northwestern, Secretary, and A. W. Briggs, Illinois Central, Assistant Secretary. The subjects discussed were five in number:

First—"The manner of tracing cars by paper." It was the opinion of the association that all connecting roads should assist the car accountant of the original car in getting that car home, giving him all the information in their power.

Second—"The time for closing car reports by station agents." All were of opinion that transfer reports to foreign roads should close at midnight, thereby showing the exact day of delivery to the foreign road, and greatly aiding in the work of tracing cars subsequently.

Third—"Manner of computing mileage." A majority favored computing mileage from train reports and verifying the same with their record movement.

Fourth—"Time of rendering reports of mileage to foreign roads and to whom." This subject evoked much discussion and considerable differences of opinion, but all agreed that the reports should be rendered to the car accountant.

Fifth—"Lists of classification of cars, numbers and marks on cars." All accountants of the convention were requested to furnish each other with lists of their respective cars, showing initial and number.

It was resolved to hold next year's meeting in New York. Much interest was taken in the proceedings and the discussions were very full and interesting.

Mobile & Girard.

At the annual meeting this week the stockholders were to vote on the question of authorizing a new issue of bonds to take up the past-due bonds and coupons which have been paid by the Central, of Georgia, as they became due, and are now held by that company.

Connecticut Railroad Commission.

A special commission, appointed in accordance with an act of the Legislature, is now in session at Hartford for the purpose of preparing a new form for the returns to be made by the railroad companies of the State. A number of railroad officers have asked to be heard by the commission. The members are George M. Woodruff from the Board of Railroad Commissioners; John W. Bacon, late Superintendent of the Danbury & Norwalk, and John W. Mansfield, of New Haven.

Ellsworth & Bucksport.

There being no present prospect of the building of the Bangor & Calais Shore Line, the town of Ellsworth, Me., has voted to subscribe $123,000 in aid of a railroad from that place northwestward to Bucksport, provided the latter town will raise $50,000. The road is to be narrow gauge, and the distance is about 20 miles. At Bucksport connection will be made with the Bangor & Bucksport road for Bangor.

Philadelphia & Reading.

The strike on this road continues without any special incident. The striking enginemen say they are confident of success; they have succeeded in drawing off some of the new men and on some parts of the line the conductors and brakemen have joined them. Some cases of damage to engines and two or three coal train wrecks are reported.

On the other hand the officers of the company say that passenger and freight trains are run on regular time and coal trains with but little delay, and that they have offers of service from all the men they need.

On April 19 some of the enginemen at Reading authorized the publication of the following proposition to General Manager Wooten:

"The insurance circular of the Reading Railroad Company to be withdrawn; the company to pay the engineers the same wages they were receiving when they withdrew from their employ, and promise that there shall be no further reduction of wages. The engineers agree on their part that they, their firemen and all the other old employes will return to work, and there shall be no strike at any time, if the above conditions are not broken by the company."

The proposition, however, was not considered and no answer was made to it by the company.

Chesapeake & Ohio Canal.

A sharp contest for the traffic of the Cumberland coal region has begun between this company and the Baltimore & Ohio. The latter opened the season by a considerable reduction in the rail rates from Cumberland to Locust Point. The Canal Company met this by a reduction of tolls, and President Gorman announces his intention to cut tolls down to 10 cents per ton, if necessary. This war is likely to have a considerable effect on the trade, as it is estimated that, with canal tolls at 10 cents, Cumberland coal can be mined and delivered at Georgetown on board vessels for less than $2.50 per ton. The Baltimore & Ohio, however, possesses a considerable advantage in the large interest it owns in the Consolidation Company, and through it in the Cumberland & Piedmont road, over which all coal must pass to reach the canal.

South Shore.

At a meeting in Boston, April 20, the stockholders voted to sell the road and property of the company to the Old Colony Railroad Company. The necessary authority for this sale was conferred by an act recently passed by the Legislature. The South Shore road is 11⅞ miles long, from Braintree, Mass., to Cohasset, and has always been controlled by the Old Colony and worked as a branch of that road.

Dividends.

Dividends have been declared as follows:

Boston & Albany, 4 per cent., semi-annual, payable May 15.

Car Trust of Pennsylvania, 1½ per cent., quarterly, payable May 1.

Railway Equipment Trust of Pennsylvania, 2 per cent., quarterly, payable May 1.

Boston & Providence, 3 per cent., semi-annual, payable May 15.

Ohio & Mississippi.

A circular has been addressed to the stockholders, signed by Ward, Campbell & Co., Williams & Guion, R. L. Cutting, Jr., & Co., James M. Hartshorne, F. P. Dimpfel, Wm. D. F. Manice and Wm. H. Cox. It says: "The undersigned stockholders of the Ohio & Mississippi Railway Company, after informal consultations among themselves and with many other stockholders, have deemed it advisable to recommend to the stockholders of the company the appointment of a committee to obtain full information as to the liabilities and resources of the company, with a view to devising and adopting a plan to relieve it from existing embarrassments, to confer with the Receiver and to take such other action for the protection of the interests of the stockholders as such committee may deem expedient. The stockholders have no information, and at present no means of information, as to the condition of their property. Their interests are wholly unrepresented and unprotected. The necessity for organization is most urgent and vital; and, if the proper action is taken, the undersigned believe that the company can be restored to solvency and that the stock will recover much of its lost value."

Hoosac Tunnel Line.

On May 1 the State of Massachusetts will resume possession of the section of the Troy & Greenfield road from North Adams, Mass., to the Vermont State line, which has been leased to the Troy & Boston Company.

The committee of the Massachusetts Legislature has, contrary to general expectation, presented only one report, which is thus summed up by the Springfield *Republican:*

"The report of the Hoosac Tunnel Committee, which was sent in to the Senate, reviews the history of the tunnel fully. It attempts in the beginning to cut down the cost of the tunnel by leaving off the interest, on the ground that when a man computes the cost of his house he does not include the interest he has paid on the mortgage. But he would be justified in so doing if the house had been 20 years in construction, during which time it was uninhabitable. This 'point' taken at the beginning of the report is a very fair gauge of its calibre all through. Over 20 pages are occupied in an attempt to squelch Crane and his 1,800 Boston petitioners so that they will never be heard from again. When it comes to the Burt plan, the desirability of all its connections is readily admitted. The principal objection to this scheme is thus stated: 'In the first place, the proposed bill is, if not a probably dangerous bill, at least a possibly dangerous bill, in that it authorizes this corporation, as a foreign corporation, to absolutely control by ownership, or lease or otherwise, any road leading to the tunnel on either side that they can get hold of by purchase or by any other means. We believe that this is very objectionable, and fraught, as we have said, with possible, and, in our opinion, very probable dangers to the interests of the people of this State. By this bill this New York corporation may take into its control the whole Hoosac Tunnel route of Massachusetts, excepting only that portion of this route which is in the possession of the commonwealth, and which, having no outlet except upon the other railroads, would be comparatively valueless unless these railroads were directly or indirectly in some manner under the control of the State.' The danger of a New York monopoly of the tunnel is then adroitly put. The report concludes with a demand for the longer trial of the toll-gate plan, as still an experiment, and proposes the following bill:"

The accompanying bill provides that the toll-gate plan, as provided by the law of 1875, which allows any connecting line to use the tunnel and State road on conforming with the regulations and paying the tolls established by the State, shall continue in force for seven years. It further requires that the roads forming the present Tunnel Line and such others as may use the tunnel shall give full and equal privileges as to connections, rates, forwarding cars, etc., for business bound through the tunnel to any connecting line now existing or hereafter to be built.

Another new plan has been brought forward for a line from Greenfield eastward to Concord, Mass., where connection would be made with the Boston & Lowell and that company's line into Boston and terminal facilities there could be used.

It now appears as if there would be much opposition to the committee's report and bill and a considerable pressure for the adoption of the Burt plan or some similar one looking to a more extensive use of the tunnel.

Paulding & Cecil.

Mr. J. S. Goshorn, contractor for this road, has begun work on the grading at Paulding, O., and intends to push the work. The road is to run from Paulding to Cecil on the Wabash road, about five miles.

Long Island.

In preparation for the summer travel this company has put a number of new cars on the road, and is doing a good deal of work on the track and road-bed.

The property-owners on Atlantic avenue have sued out a temporary injunction to restrain the company from using or completing the track lately laid on that street. A hearing on the question of making the injunction permanent is to be had shortly.

Brattleboro & Whitehall.

At an adjourned town meeting, held April 14, the town of Brattleboro, Vt., voted by a large majority to take $50,000 stock in this road. It is thought that this action will be followed by other towns on the line, which have been waiting to see what Brattleboro would do.

Houston & Texas Central.

The New York *Tribune* of April 19 says: "Charles Morgan received advices from Texas yesterday that the threatened foreclosure on that day of the mortgages upon the Houston & Texas Central Railroad was postponed by general consent, it being thought that both the road and its creditors would find it advantageous to wait longer and see what better management would bring forth. Mr. Morgan stated positively that in buying a controlling interest in the road he assumed none of its debts, and no one could say that he ever suggested doing so. The road, in his estimation, is valuable property, well

able with proper management to meet its expenses. But its debts are very heavy—much heavier, in fact, than he supposed when he made his purchase—and he says that it will require careful, earnest support from its managers and patience at the hands of its creditors before it will recover the ground lost in the past." If Mr. Morgan has acquired a "controlling interest in the road" he has virtually assumed all of its debts, though of course the assumption is not personal—does not involve another property of his than this controlling interest. This, however, he cannot preserve unless he pays the company's debts, except by the consent of its creditors. The term "foreclosure" used above is not correct, as the application for a receiver was made by the general creditors and there has been no default on the bonded debt.

Michigan Central.

It is reported that the opponents of the present management have prepared the following list of directors, to be submitted to the stockholders at the next regular meeting: Ex-Gov. John J. Bagley, of Detroit, a wealthy tobacco manufacturer; Sidney Dillon, President of the Union Pacific Railroad; H. E. Sargent, formerly for many years Superintendent of the Michigan Central; Robert Harris, President of the Chicago, Burlington & Quincy Railroad; F. Gordon Dexter of Boston, a director of the Union Pacific; Frederick Billings, at present a director of the Michigan Central and also of the Northern Pacific; E. A. Kent, of Kent & Co., of New York and Chicago; W. L. Scott, President of the Canada Southern Railroad, and a director of the Rock Island, the Northwestern and the Lake Shore, and Albert Keep, President of the Chicago & Northwestern Railroad. The present board of directors consists of Samuel Sloan, President; Moses Taylor, George F. Taiman, John Jacob Astor, August Belmont, R. G. Rolston, Isaac Bell, Frederick Billings, and Nathaniel Thayer.

Delphos Southern.

A company by this name has been organized to build a narrow-gauge road from Delphos, O., southward 80 miles to Dayton. The capital stock is fixed at $500,000. The line would be parallel to and but a few miles from the Dayton & Michigan.

Columbia & Port Deposit.

At a stockholders' meeting in Philadelphia, April 16, resolutions were passed authorizing the directors to arrange with the Pennsylvania Railroad Company to operate the road. In accordance with this authority arrangements are now being made and the entire line will soon be opened for traffic.

Burksville Branch.

It is proposed to build a branch from the Louisville & Nashville at Glasgow Junction, Ky., southeast to Burksville in Cumberland County, about 43 miles. There is a good country on the line, and petroleum is said to exist in the hills around Burksville, several wells having been bored there some ten years ago.

Sunfish Valley.

This company has filed articles of incorporation in Ohio for the purpose of building a narrow-gauge railroad from Jackson, in Jackson County, by way of the Sunfish Creek Valley and Sinking Spring to Cincinnati. The distance is about 110 miles, and the capital stock is fixed at $200,000. Part of the line is the same as that of the Cincinnati & Eastern, now under construction.

Chicago, Danville & Vincennes.

The formal deed of the Indiana Division was delivered to the purchasers at the foreclosure sale on April 12 and the deed of the Illinois Division on April 14. The purchasers, Messrs. F. W. Huidekoper, T. W. Shannon and J. M. Dennison, took possession of the property April 18, and will hold and operate it as trustees until the organization of a new company is completed. It is said that the new company will be called the Chicago & Nashville.

A circular dated April 18 announces that from April 18 the property will be in charge of F. W. Huidekoper as General Manager for the purchasers, who will operate it until further notice. From that date all accounts will be kept distinct and settled without intermixture with the affairs of the late Receiver.

Florida Central.

The recent trouble on this road has been settled by a temporary agreement under which the Receiver remains in charge for the present. The Receiver and the Governor were to meet in Tallahassee this week for further negotiations. Meanwhile the road is advertised to be sold for account of the bondholders, the sale to take place July 2.

Maine Railroad Taxation.

The Governor and Council of Maine have assessed the following railroad tax for the current year: Atlantic & St. Lawrence (Grand Trunk), $14,751; Boston & Maine, $18,686; Dexter & Newport, $1,182; Maine Central, $3,381; Portland Horse Railroad, $775; Portland, Saco & Portsmouth, $8,920; Portsmouth, Great Falls & Conway, $206; St. Croix & Penobscot, $25; Lewiston & Auburn, $3,375.

Kissisquoi.

A number of small judgments have been entered against this road in the courts at St. Albans, Vt., and the County Court has ordered an accounting. The judgments have been sued out by parties connected with the Central Vermont and are chiefly for legal services.

Northern, of New Jersey.

This company has been advertising for sale at auction 2,500 shares of stock, in lots of 50 shares and upward, the par value of the shares being $100. The road is 26 miles long and worked by the Erie for 65 per cent. of the gross receipts. By the latest published report the stock was $1,000,000; funded debt, $400,000; gross earnings, $278,992. In 1875 a dividend of 3¾ per cent. was paid.

Anderson, Lebanon & St. Louis.

Arrangements have been completed for the resumption of work on this road, and the company expects to build during the coming summer 25 miles of road from the present terminus at Noblesville, Ind., westward to Lebanon. It is probable that a further arrangement may be made which will secure the completion of the road to Montezuma this year.

Philadelphia & Cape May Short Line.

A company by this name has been organized in New Jersey to build a railroad by the most direct route to Cape May, a distance of 72 miles. The capital stock is fixed at $750,000. The existing line of the West Jersey Railroad, which is 81 miles long, has heretofore served to carry the summer pleasure travel very acceptably, and that travel, although large, is not likely to yield much profit if divided between two roads. The local traffic of the country along the line is not sufficient to support a railroad by itself, and as that from the lower end of the new line must be carried in competition with the West Jersey and from the eastern end with the Camden & Atlantic also, there does not appear to be much prospect of profit from the proposed road.

Wallkill Valley.

A plan of reorganization has been adopted by the bondholders which provides for the purchase of the road and the organization of a new company, which shall issue $675,000 preferred and $825,000 common stock, $250,000 first-mortgage and $500,000 second-mortgage income bonds. Of the first-mortgage bonds $125,000 are to be issued in exchange for money contributed for the purchase of the road, the rest to be reserved for use as needed. The preferred stock and income bonds are to be issued in exchange for the present first-mortgage bonds and other preferred claims, the holders of which will receive 40 per cent. of their claims in bonds and 60 per cent. in stock.

The road is 33 miles long, from Montgomery, N. Y., to Kingston; it is worked by the Erie under an agreement to furnish train-service, and has never yet earned enough to pay the working expenses. The deficit in 1875 was $40,055 and last year, it is stated, about $30,000.

ANNUAL REPORTS.

West Jersey.

This company owns a line from Camden, N. J., to Millville, 40.83 miles, with a branch from Glassboro to Bridgeton, 18.60 miles, and it works under lease the Cape May & Millville road, 41.35 miles, which extends its Main Line to Cape May; the Salem Railroad, from Elmer to Salem, 16.58 miles, and the Swedesboro Railroad, from Woodbury to Swedesboro, 10.80 miles, making 128.16 miles in all, of which 59.43 miles are owned and 68.73 leased; 82.18 miles are main line and 45.98 branches. The latest report is for the year ending Dec. 31, 1876.

The equipment consists of 20 locomotives, 52 passenger, 7 combination and 4 baggage cars; 30 box, 2 stock, 60 platform and 130 dump cars; 26 hand and 23 truck cars. One heavy passenger locomotive was added to the equipment and another bought to replace a light one condemned and broken up; 3 parlor and 3 passenger cars were added to the equipment.

The capital account at the end of the year was as follows:

Stock ($22,880 per mile)	$1,359,750 00
Bonds ($40,384 per mile)	2,400,000 00
Balances of accounts	58,925 21
Profit and loss	121,303 22
Total ($66,307 per mile)	$3,939,978 43

The company owns $403,000 Cape May & Millville stock and $415,000 bonds; $70,000 Salem stock; $250,100 Stockton Hotel stock and $20,540 other stocks and bonds, its investments being valued at $1,137,923.60. There are $198,000 bonds of the company and its leased lines in the sinking fund. The capital accounts of the leased lines are:

	Stock.	Bonds.	Total.	Per mile.
Cape May & Millville	$500,000	$500,000	$1,000,000	$24,184
Salem	180,550	100,000	280,550	16,921
Swedesboro	93,350	200,000	293,350	27,163

The work of the year was as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Train mileage, passenger	320,537	281,995	Inc.. 38,542	13.7
" " freight	107,341	105,865	Inc.. 1,476	1.4
" " service	11,164	12,293	Dec.. 1,129	9.2
Total	439,042	400,153	Inc.. 38,889	9.7
Passengers carried	767,296	656,212	Inc.. 111,084	16.9
Passenger mileage	19,411,379	16,290,518	Inc..3,120,861	19.2
Tons freight carried	132,397	144,233	Dec.. 11,836	8.2
Tonnage mileage	4,083,789	4,272,805	Dec.. 289,016	6.6
Average passenger train load, No.	60.56	57.77	Inc.. 2 79	4.8
Average freight train load, tons	38.04	41.31	Dec.. 3.27	7.9

The increase in passenger business was entirely in transient pleasure travel to Cape May and local travel to the Centennial, both carried at very low rates. The decrease in freight business was caused by a partial failure of the fruit and vegetable crops. There was a large decrease in tonnage of marl, from the same cause. The average receipt and cost per unit of traffic were, in cents:

	Per passenger per mile.			Per ton per mile.		
	Receipt.	Cost.	Net.	Receipt.	Cost.	Net.
1876	2.44	1.71	0.73	4.71	3.23	1.48
1875	2.39	1.47	0.92	4.69	2.89	1.80
Inc. or Dec.	+ 0.05	+ 0.24	— 0.19	+ 0.02	+ 0.34	— 0.32

The earnings for the year were as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Passenger traffic	$477,423 72	$394,973 38	Inc..$82,450 34	20.9
Freight traffic	196,170 45	209,062 27	Dec.. 12,891 82	6.2
Mails and express	57,417 26	55,761 96	Inc.. 1,655 30	3.0
Total	$731,011 43	$659,797 61	Inc..$71,213 82	10.0
Expenses	463,374 95	369 509 73	Inc.. 96,865 22	26.4
Net earnings	$267,636 48	$293,287 88	Dec..$25,651 40	8.7
Gross earnings per mile	5,703 90	5,148 00	Inc.. 555 90	10,8
Net earnings per mile	2,038 30	2,288 00	Dec.. 199 70	8.7
Per cent. of expenses	63.39	55.55	Inc.. 7.84	14.1

The expenses were increased by large renewals and improvements. The income account was as follows:

Net earnings		$267,636 48
Interest on investments, and incidentals		44,945 54
Total		$312,582 02
Interest on bonds and mortgage	$154,566	
Rent, Cape May & Millville R. R.	41,320	
" Salem R. R.	13,133	
" Swedesboro R. R.	19,901	
		228,914 00
Surplus		$83,668 02
Balance of profit and loss from 1875	$45,060 69	
Less sundry accounts charged off	7,425 49	
		37,635 20
Balance, Dec. 31, 1876		$121,303 22

Out of this a dividend of 3 per cent. has been declared since the close of the year. There was an actual loss on the Salem lease of $10,724.48, and on the Swedesboro lease of $14,913.17.

There were used in renewals 2,325 tons of 60-lb. iron rails and 38,514 new ties. There are now only 11 miles of the main line laid with the old light rails. It is proposed to replace these during the current year and also to complete the laying of steel from Camden to Glassboro. Much of the old iron taken up can be used in repairs on the branches. The new depot at Cape May has been completed, a track-tank built at Millville and many minor improvements made.

Providence & Worcester.

This company owns a line from Providence, R. I., to Worcester, Mass., 43.41 miles; a branch in Worcester, 1 mile long, and the East Providence Branch, 7 miles, 51.41 miles in all. It works under lease the Milford & Woonsocket road, 3.88 miles, and the Hopkinton road, 11.55 miles, which together form a branch from Woonsocket, R. I., to Ashland, Mass. The total worked is 66.84 miles. There are 30.65 miles of second track and 22 miles of sidings. The report is for the year ending Sept. 30, 1876, at the close of which the equipment consisted of 30 engines, 2 snow-plows, 41 passenger-train cars, 309 box, 128 flat and 843 coal cars.

The credit side of the capital account is as follows:

Stock ($38,903 per mile)	$2,000,000 00
Bonds ($9,726 per mile)	500,000 00
Notes payable ($28,983 per mile)	1,490,000 00
Unclaimed dividends	4,785 00
Balance of income account	23,676 64
Total ($78,165 per mile)	$4,018,461 64

The amount of notes payable was increased by $120,000 during the year.

The work done was as follows:

	1875-76.	1874-75	Inc. or Dec.	P. c.
Train mileage, passenger	237,680	235,320	Inc.. 2,360	1.0
" " freight	283,565	286,090	Dec.. 2,525	0.9
" " service	13,150	25,310	Dec.. 12,160	48.1
Total	534,395	546,720	Dec.. 12,325	2.3
Passengers car led	1,585,393	1,692,143	Dec.. 106,750	6.3
Passenger mileage	13,516,887	14,976,737	Dec.. 1,459,650	9.7
Tons freight carried	555,960	484 837	Inc.. 71,123	14.7
Tonnage mileage	17,192,076	14,283,114	Inc.. 2,908,962	20.4
Average passenger train load, number	56.87	63.64	Dec.. 6.57	10.3
Average freight-train load, tons	60.63	49.33	Inc.. 10.70	21.4
Average receipt per passenger per mile	2.52 cts.	2.52 cts.	.....	....
Average receipt per ton per mile	3.53 "	3.93 "	Dec.. 0.40 ct.	10.2

Of the passenger mileage 12 per cent., and of the tonnage mileage 37 per cent. was of business to and from other roads. The earnings per passenger train mile were $1.50; expenses, $1.04; net earnings, $0.46. Earnings per freight train mile, $1.81; expenses, $1.42; net earnings, $0.39. The earnings for the year were:

	1875-76.	1874-75.	Inc. or Dec.	P.c.
Passengers	$340,231 51	$337,934 41	Dec..$37,702 90	10.0
Freight	537,197 47	494,432 65	Inc.. 42,764 82	8.6
Mail, express, etc	21,675 52	22,112 54	Dec.. 437 02	2.0
Total	$899,104 50	$894,479 60	Inc.. $4,624 50	0.5
Expenses	668,123 28	653,220 96	Inc.. 14,902 32	2.3
Net earnings	$230,981 22	$241,258 64	Dec..$10,277 43	4.3
Gross earn. per mile	13,451 59	13,382 00	Inc.. 69 59	0.5
Net " " "	3,455 73	3,609 00	Dec.. 153 27	4.3
Per cent. of expenses	74.31	73.03	Inc.. 1.28	1.8

The income account may be summed up thus:

Net earnings	$230,981 22
Sale of company's notes	120,000 00
Decrease of balance on hand	51,895 55
Increase of dividends unclaimed	1,010 00
Total	$403,886 77
Rentals Milford & Woonsocket and Hopkinton roads	$10,980 00
Interest on bonds	30,000 00
" " unfunded debt	76,529 20
Dividends, 8 per cent	160,000 00
Construction and equipment	126,377 57
	403 886 77

The principal items of construction and equipment were for the viaduct at Worcester and completion of the East Providence Branch.

There was a serious falling off in passenger business and also a decrease in local freight, the latter being more than balanced by the increase of through freights.

The road and equipment were fully maintained and the bridge known as the Old Maid's Bridge at Woonsocket was rebuilt, with new abutments, at a considerable cost. The expensive work on the viaduct at Worcester is nearly finished; the Union Depot in that city is completed and in use.

Atlantic & Gulf.

The company owns and works the following lines:

	Miles.
Main Line, Savannah, Ga., to Bainbridge	237
River Extension, to wharves at Savannah	2
Albany Division, Thomasville, Ga., to Albany	59
Florida Division, Dupont, Ga., to Live Oak, Fla	48
Junction Branch, Savannah & Charleston connection	4
Total	350

The road is the only rail connection to Eastern and Middle Florida; it serves a large part of Southern Georgia, having, however, a good deal of poor country along the line, and its Albany Division penetrates the cotton belt of Southwestern Georgia, but meets there with the competition of other lines. The Junction Branch is used by the Savannah & Charleston road, whose trains also enter its depot in Savannah. The present report covers the year ending Dec. 31, 1876, since the close of which the company has defaulted in the interest on its bonds, and the road is now in the hands of receivers.

The equipment consists of 25 engines; 19 passenger, 4 smoking and baggage and 4 mail and express cars; 219 box, 117 flat, and 11 stock cars; 1 steam pile-driver, 4 service cars, 9 hand and 74 push cars.

The liabilities at the close of the year were as follows:

Stock		$3,693,700 00
South Georgia & Florida guaranteed 7 per cent. stock		782,976 69
Total stock ($12,791 per mile)		$4,476,976 69
Savannah, Albany & Gulf bonds	$300,000	
First-mortgage sectional bonds	334,000	
Consolidated bonds	1,666,000	
South Georgia & Florida bonds	664,000	
Free bonds	52,500	
Junction Branch bonds	50,000	
Total bonded debt ($8,761 per mile)		3,066,500 00
Coupon notes	$500,000 00	
Due Bills	89,000 00	
Bills, accounts and balances payable	282,760 92	
		871,760 92
Total ($24,043 per mile)		$8,414,937 61

This is not, apparently, an excessive capital account, and the net earnings for the year, as stated in the report, were sufficient for the interest payments on the funded debt. The default is attributed to the large proportion of floating debt and the difficulty of carrying it.

The work of the year was as follows:

	1876.	1875.	Inc. or Dec.	P.c.
Revenue train mileage	578,930	601,820	Dec.. 22,890	3.8
Engine mileage	651,387	706,812	Dec.. 55,425	7 8
Passenger car mileage	1,839,476	1,813,199	Inc.. 26,277	1.4
Freight " "	4,774,038	5,161,639	Dec..387,601	7.5
Service " "	377,598	361,751	Inc.. 15,847	4.4
Passengers carried	86,913	105,100	Dec.. 18,187	17.3
Passenger mileage	5,770,277	.....	.....	....
Tons freight carried	170,806	.....	.....	....
Tonnage mileage	18,836,920	.....	.....	....
Av. receipt per pass. per mile	3.40 cts.	.....	.....	....
" " " ton "	2.53 cts.	.....	.....	....

The average load per passenger car mile was 3.14 passengers; per freight car mile, 3.95 tons. The sources and distribution of the traffic for the last three years were as follows:

	—Freight, per ct.—			—Pass., per cent.—		
	1876.	1875.	1874.	1876.	1875.	1874.
Savannah and J., P. & M. R. R.	13	14	13	13	16	10
Savannah and Macon & Bruns. Railroad	6	7	8	1	2	2
Savannah and Chattahoochee River	1	2	2	..	..	..
Savannah and local stations	67	66	69	25	24	26
Local stations (Sav. excepted)	9	7	5	55	54	60
Macon & B. R. R. and local stations	2	2	1	..	..	..
Mac. & B. and J., P. & M. R. R.	..	..	..	6	4	2
Express freight	2	2	2	..	..	..

There is an increased tendency of freight, especially corn and provisions, to stations on the line from the West, by way of Macon and Albany, and a corresponding decrease in business through Savannah. This was doubtless increased last year by the yellow fever at Savannah and the consequent de-

rangement of business, but it has been apparent for several years. The principal items of freight were 106,936 bales cotton; 187,548 bushels corn; 30,830,124 feet lumber, and 79,828 barrels rosin and turpentine, the last item showing an increase of 63 per cent. The earnings per revenue train mile were $1.65; expenses, $1.04; net earnings, $0.61. The earnings of the road for the year were as follows:

	1876.	1875.	Inc. or Dec.	P.c.
Freight	$665,274 99	$682,733 53	Dec.. $17,458 54	2.6
Passengers	196,360 01	209,503 59	Dec.. 13,143 58	6.3
Mails	32,935 90	38,264 99	Dec.. 5,329 09	13.9
Incidentals	64,807 04	35,367 65	Inc.. 29,439 39	83.2
Total	$959,377 94	$965,869 76	Dec.. $6,491 82	0.7
Working expenses..	606,464 65	642,927 46	Dec.. 36,462 81	5.7
Net earnings	$352,913 29	$322,942 30	Inc.. $29,970 99	9.3
Gross earn. per mile	2,772 77	2,791 53	Dec.. 18.76	0.7
Net " "	1,019 98	933 36	Inc.. 86.62	9.3
Per cent. of exps...	63.21	66.56	Dec.. 3.35	5.0

It is believed that the earnings would have shown a considerable increase but for the loss caused by the yellow fever at Savannah, which caused the diversion of much business, besides an actual loss of traffic.

There was expended for improvements and additions $12,581.01, besides $1,633.05 on the Junction Branch, making its total cost $39,534.95, or $9,884 per mile. There were used in renewals 100 tons steel and 534 tons of iron rails, 138,464 ties and 2,132,172 feet lumber; 88 per cent. of the ties and 80 per cent. of the bridges and trestles on the road have been renewed in six years. The Savannah wharf was extended 60 feet; one span (150 ft.) of the Flint River bridge replaced by a combination truss, and 8,566 feet new sidings built, making 17.92 miles now in use.

General Superintendent H. S. Haines, in his report, makes an interesting application of Mr. Fink's investigations into the cost of traffic to the local circumstances of the road. Mr. Haines also refers to the good conduct and faithful services of the officers and employes in Savannah under the trying circumstances of the yellow-fever epidemic.

New Haven & Northampton.

This company owns a line from New Haven, Conn., northward to Northampton, Mass., 83.88 miles, with a branch from Farmington, Conn., to New Hartford, 14.09 miles, and it leases the Holyoke & Westfield road 10.32 miles, making 97.97 miles owned and 108.29 worked. The line is equipped with 20 engines and 12 snow-plows; 17 passenger and 11 baggage, mail and express cars; 111 box, 300 flat and 41 gravel and service cars. The passenger equipment is supplied with the Westinghouse air brake. The report is for the year ending Sept. 30, 1876.

The capital account credits at the close of the year were as follows:

Stock ($25,110 per mile)	$2,460,800 00
Funded debt ($22,242 per mile)	2,199,000 00
Bills payable	236,700 00
Coupons and dividends unclaimed	22,252 00
Income account, balance	7,147 00
Total ($50,067 per mile)	$4,905,099 00

The funded debt increased $17,000 and the bills payable $76,500 during the year; the expenditures on property account were $104,442.65.

The work done was as follows:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Train mileage, passenger	213,049	211,085	Inc.. 1,964	0.9
Train mileage, freight	156,855	148,146	Inc.. 8,709	5.9
" " service.	14,375	12,330	Inc. 2,045	16.6
Total	384,279	371,561	Inc.. 12,718	3.4
Passengers carried	306,308	333,163	Dec.. 26,855	8.1
Passenger mileage	4,626,908	4,916,399	Dec.. 289,491	6.1
Tons freight carried	262,871	257,322	Inc.. 5,549	2.2
Tonnage mileage	11,256,872	10,107,674	Inc.. 1,149,198	11.4
Average pass'ger train load, No.	22.72	23.34	Dec.. 1.62	6.9
Average freight train load, tons	71.77	68.23	Inc.. 3.54	5.2
Average receipt per passenger per mile	2.97 cts.	2.96 cts.	Inc.. 0.01	0.3
Average receipt per ton per mile	3.43 "	3.92 "	Dec.. 0.49	12.5

Of the passenger mileage 26.3 per cent., and of the tonnage mileage 34.1 per cent. was of business to and from other roads. The earnings for the year were:

	1875-76.	1874-75.	Inc. or Dec.	P. c.
Passenger Departm't.	$163,872 24	$174,294 14	Dec.. $10,421 90	6.0
Freight Department.	403,794 99	418,407 49	Dec.. 14,612 50	3 5
Rents	2,730 16	2,462 71	Inc.. 267 45	10.7
Total	$570,397 39	$595,164 34	Dec.. $24,766 95	4.2
Expenses	389,815 61	399,250 53	Dec.. 9,434 92	2.4
Net earnings	$180,581 78	$195,913 81	Dec $15,332 03	7.8
Gross earn. per mile.	5,267 31	5,496 02	Dec.. 228 71	4.2
Net " " "	1,667 58	1,809 16	Dec.. 141 58	7.8
Per cent of expenses.	68.34	67.08	Inc.. 1.26	1.9

The income account may be summed up as follows:

Balance from previous year		$3,618 88
Net earnings		180,481 78
Total		$184,200 66
Interest on bonds	$143,055 00	
" floating debt	19,352 43	
Rental Holyoke & Westfield R. R.	14,546 13	
Discount on bonds	100 00	
		177,053 66
Balance, Sept. 30, 1876		$7,147 00

During the year 7.79 miles of steel rails and 38,256 ties were used in renewals. Two old bridges were replaced by new iron truss bridges. No dividends have been earned or declared since October, 1873.

Train Accidents in March.

On the afternoon of the 1st a freight train on the Seaboard & Roanoke road was thrown from the track by a broken axle near Deep Creek, Va., and several cars were wrecked.

On the afternoon of the 1st, as a passenger train on the Boston & Maine road was near Wilmington, Mass., one of the parallel rods broke and the loose ends tore a hole in the boiler and broke up one side of the cab. The engineman was badly scalded.

Late on the night of the 1st a car of a passenger train on the Pennsylvania Railroad was thrown from the track by a broken axle at Elizabeth, N. J., delaying the train two hours.

On the evening of the 4th a car of a passenger train on the Atlanta & West Point road was thrown from the track and upset at Newnan, Ga., by a broken switch-rod.

On the 6th some cars of a freight train on the Pacific Division of the Northern Pacific ran off the track near Kalama, Wash. Terr.

On the morning of the 7th a car of a passenger train on the Portsmouth, Great Falls & Conway road jumped the track in Great Falls, N. H.

On the 7th the caboose of a freight train on the Louisville & Nashville road ran off the track and down a bank near Richland, Tenn. The car was wrecked, killing one man and injuring another.

On the night of the 7th a freight train on the St. Louis & Southeastern road broke through a bridge near Mt. Vernon, Ill., wrecking several cars and injuring a brakeman.

On the morning of the 8th four cars of a freight train on the Chicago, Rock Island & Pacific road were thrown from the track near Camden Point, Mo., blocking the road some time.

On the morning of the 8th an express train on the Great Western Railway was thrown from the track near Simcoe, Ont., by the breaking of a wheel under the tender. A brakeman and two passengers were hurt.

On the morning of the 8th the engine of a coal train on the St. Louis & Southeastern road ran off the track in East St. Louis, Ill., blocking the road some time.

On the morning of the 8th two coal cars of a train on the Danbury & Norwalk road jumped the track near Bethel, Conn.

Near noon on the 8th a car of a freight train on the Missouri Pacific road ran off the track near Pleasant Hill, Mo., causing some delay. The accident is said to have been caused by the spreading of the rails.

Near noon on the 8th, as an express train on the Chicago & Northwestern road was entering the depot at Galt, Ill., the boiler of the engine exploded, destroying the engine, killing the engineman, fireman and the station agent, who was standing on the platform. A committee of master mechanics, who examined the wreck, reported that, in their opinion, the explosion was caused by a want of water over the crown sheet.

On the 8th the tender of an express train on the Intercolonial road ran off the track near Memramcook, N. B., delaying the train an hour.

On the afternoon of the 8th an express train on the Vandalia Line ran into the rear of a freight near Greencastle, Ind., damaging an engine and several cars.

On the afternoon of the 8th, on the Chicago, Rock Island & Pacific road, there was a butting collision between a freight and a local passenger train, by which some damage was done and the road blocked four hours.

On the evening of the 8th a passenger train on the Painesville & Youngstown road ran off the track near Burton, O.

On the 9th a freight train on the Old Colony road ran into some cars which had been blown out of a siding at Bristol, R. I., during a heavy gale. The engine and several cars were badly damaged.

On the afternoon of the 9th, near Corunna, Ind., on the Lake Shore & Michigan Southern Railway, there was a butting collision between a passenger and a freight train, by which both engines were badly damaged, a fireman and the mail agent hurt. It is said that the freight engineman started out from the preceding station, where he should have waited for the passenger, without orders.

On the afternoon of the 12th a passenger train on the Boston & Maine road ran into the rear of a coal train which was standing on the track at Exeter, N. H. The engine and three coal cars were wrecked.

On the afternoon of the 12th a freight train on the Erie Railway struck a broken rail at Hankins, N. Y., and 16 cars were thrown from the track, four of them going down the bank.

On the night of the 12th an express freight train on the Philadelphia, Wilmington & Baltimore road broke in two near Bellevue, Del., and the rear section afterwards ran into the forward one, breaking three cars and killing a tramp, who was stealing a ride.

On the night of the 12th a freight train on the Pennsylvania Railroad broke in two near Mineral Point, Pa., and the rear section afterwards ran into the forward one, wrecking several cars.

On the afternoon of the 13th a freight train on the Vermont Central road ran into a preceding freight near West Randolph, Vt., damaging the engine and several cars and blocking the road three hours.

On the 14th the engine of a freight train on the Sheboygan & Fond du Lac road ran off the track in Ripon, Wis., blocking the road several hours.

On the 14th a passenger train on the Savannah & Charleston road was thrown from the track near Yemassee, S. C., by the breaking of an axle under the tender. Four cars were thrown off, one of them being badly broken; the mail-agent was slightly and a brakeman badly hurt.

On the afternoon of the 15th a freight train on the Intercolonial road ran into an engine which was standing on the track near Wentworth, N. B.

On the evening of the 15th a freight train on the Port Royal road ran into a lot of cattle near Yemassee, S. C., and seven cars were thrown from the track, some of them being badly broken up.

Early on the morning of the 16th a local passenger train on the Ohio & Mississippi road was thrown from the track by a broken switch-rod at Nebo, Ind. The engine went down a bank and upset into the Ohio River, injuring the fireman.

On the morning of the 16th a freight train on the Marietta & Cincinnati road ran into the rear of a preceding freight train which was standing on the track in Cincinnati, O., damaging several cars.

On the morning of the 16th the engine of a freight train on the Chicago, Rock Island & Pacific was thrown from the track by a broken rail, near Cameron, Mo.

On the morning of the 16th a freight train on the Lake Shore & Michigan Southern road ran into the rear of a stock train, which had stopped for water, at Stryker, Ind. Several stock cars were wrecked and the wreck caught fire, burning up three cars and a bridge close by.

On the evening of the 16th the engine and two cars of a train on the Wabash road were thrown from the track by a misplaced switch at Anderson, Ill., and the engine upset.

On the night of the 16th eleven cars of a freight train on the Chicago, Danville & Vincennes road were thrown from the track near St. Anne, Ill., by the spreading of the rails. The cars were wrecked and the road blocked several hours.

On the morning of the 17th a freight train on the Central Pacific ran off the track near Colfax, Cal., blocking the road some time.

On the 17th the boiler of a heavy mogul engine on the Baltimore & Ohio road exploded at Keyser, W. Va., wrecking the engine, killing the fireman, injuring the engineer, conductor and brakeman. The engine was attached to a freight train, but was standing still.

On the evening of the 17th a car of a passenger train on the Sussex Railroad was thrown from the track by a broken axle near Andover, N. J., delaying the train four hours.

On the night of the 17th an express train on the Western & Atlantic road struck a broken rail near Chicamauga, Tenn., and the three rear cars were thrown from the track, one of them being upset and badly broken. A brakeman was hurt.

On the morning of the 19th a freight train on the Hannibal & St. Joseph road went through the trestle approach to the Long Branch bridge, near Kidder, Mo., which had been partially burned during the night. The engine and ten cars went down and were piled up together in a very bad wreck. The engineman was killed, the fireman and a brakeman badly injured.

On the 19th the engine of a freight train on the Chicago, Burlington & Quincy road was thrown from the track by a misplaced switch in the yard at Burlington, Ia.

On the evening of the 19th a passenger train on the Galveston, Harrisburg & San Antonio road struck a steer near Harwood, Tex., throwing the engine and baggage car from the track. The engine upset and was badly damaged, blocking the track 10 hours. The engineman and a tramp, who was stealing a ride, were hurt.

On the morning of the 20th a freight train on the New York & New England road was thrown from the track near Putnam, Conn., by the spreading of the rails and seven cars were wrecked.

On the 20th, an axle broke in the truck of the engine of a passenger train on the Intercolonial Railway, throwing the engine from the track, at Wellsford, N. B.

On the 20th, a coal train on the Pennsylvania Railroad broke in two near Waverly, N. J., and, when the engineman found it out and went back for his train, some more broke loose and ran back into the first detachment, which had stopped, breaking several cars badly.

Late on the night of the 21st, on the Baltimore & Ohio road, there was a butting collision between an east-bound passenger and a west-bound freight train, near Cornwallis, W. Va. Several cars were badly damaged. The accident is said to have been caused by the carelessness of the freight crew.

On the 22d, the engine of a construction train on the Portland & Ogdensburg road was thrown from the track by the spreading of the rails at Highgate, Vt.

On the morning of the 23d, there was a butting collision between two freight trains on the Richmond & Danville road, at New's Ferry, Va., by which both engines were damaged and a fireman killed. It is said that the north-bound train should have waited for the other at South Boston, but did not stop.

About noon on the 23d, two freight cars and the way car of a mixed train on the Indianapolis & Vincennes road ran off the track as the train was approaching a trestle-bridge near Worthington, Ind. On reaching the bridge the three cars went off and fell some distance to the ground. They were badly broken, injuring one passenger fatally, ten others and two trainmen less severely.

On the 24th, a car in a freight train on the Missouri, Iowa & Nebraska road ran off the track near Lancaster, Mo., and was dragged for over a mile before the accident was discovered.

On the 24th a car of a freight train on the New Haven & Northampton road ran off the track and upset while the train was switching in the yard at Northampton, Mass.

On the morning of the 26th two cars of a freight train on the Ohio & Mississippi road were thrown from the track near Flora, Ill., by the spreading of the rails, blocking the road for a time.

On the morning of the 26th an extra stock train on the St. Louis, Keokuk & Northwestern road broke through a bridge near Canton, Mo., ditching five cars and killing several head of cattle. The bridge was being repaired and the workmen failed to signal the train.

On the afternoon of the 28th the engine and two cars of a passenger train on the Chicago, Rock Island & Pacific road were thrown from the track by a misplaced switch in the yard at Leavenworth, Kan.

On the night of the 28th nine cars of a freight train on the Boston & Providence road were thrown from the track by a misplaced switch in the yard at Providence, R. I., and several of them were badly broken.

On the 29th a freight train on the Southern Central road ran off the track near Groton, N. Y., damaging several cars.

On the 29th several cars of a freight train on the Hannibal & St. Joseph road were thrown from the track and into a culvert near Laclede, Mo., by the spreading of the rails, blocking the road 10 hours.

On the afternoon of the 30th a freight train on the Cayuga road was thrown from the track at Mile Point, N. Y., by a landslide, which came down just as the train was passing.

This is a total of 58 accidents whereby 9 persons were killed and 31 injured. Seven accidents caused the death of one or more persons each; eight caused injury less than death, while 43, or 74 per cent. of the whole, caused no injury serious enough for record.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:	
Rear collisions	9
Butting collisions	5
	14
DERAILMENTS:	
Unexplained	14
Spreading of rails	6
Broken axle	5
Misplaced switch	4
Broken bridge	3
Broken rail	3
Broken switch-rod	2
Cattle on track	2
Broken wheel	1
Land slide	1
	41
Boiler explosion	2
Broken connecting rod	1
Total	58

One collision was caused by cars blown out of siding; two by mistake or disobedience of orders; two by want of signals, and three by trains breaking in two. The three broken bridges were all of wood; one had had the timbers partly burned through by a smouldering fire and one was undergoing repairs when it gave way. There were 23 accidents resulting directly from defect or failure of road or equipment. Of the derailments, 14 were of passenger and 27 of freight trains; nine collisions were between two freight and five between a freight and a passenger train, while of the other accidents two were to passenger and one to a freight train.

Compared with March, 1876, there is a decrease of 51 accidents, of 21 killed and of 64 injured.

The month presents no especial feature except the very small number both of accidents and casualties. March usually has many accidents, being a month of storms and of changeable weather, and a month when the weak spots in a road and the wear and tear of the winter are very apt to show themselves. This year it was exceptionally favorable and the list is very short.

For the year ending with March the record is as follows:

	No. of accidents.	Killed.	Injured
April	58	6	47
May	64	15	116
June	52	19	73
July	79	17	69
August	75	22	76
September	106	41	333
October	103	40	135
November	96	23	135
December	88	24	141
January	147	10	146
February	56	5	41
March	58	9	31
Totals	983	299	1,135

The averages per day for the month were 1.87 accidents, 0.29 killed and 1.00 injured; for the year they were 2.69 accidents, 0.82 killed and 3.08 injured. The averages for the month are thus all much below those for the year. The average casualties per accident were for the month 0.155 killed and 0.534 injured; for the year, 0.304 killed and 1.144 injured. The yearly averages, however, are unusually large, being swelled by the great number of casualties at Ashtabula in December.

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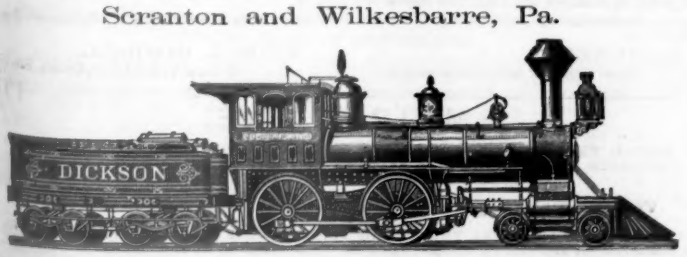

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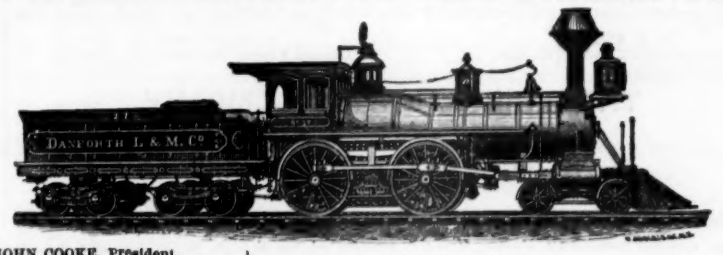

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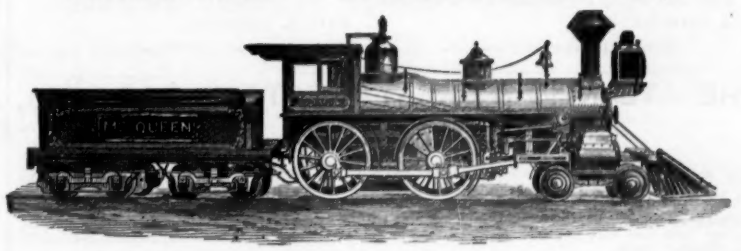

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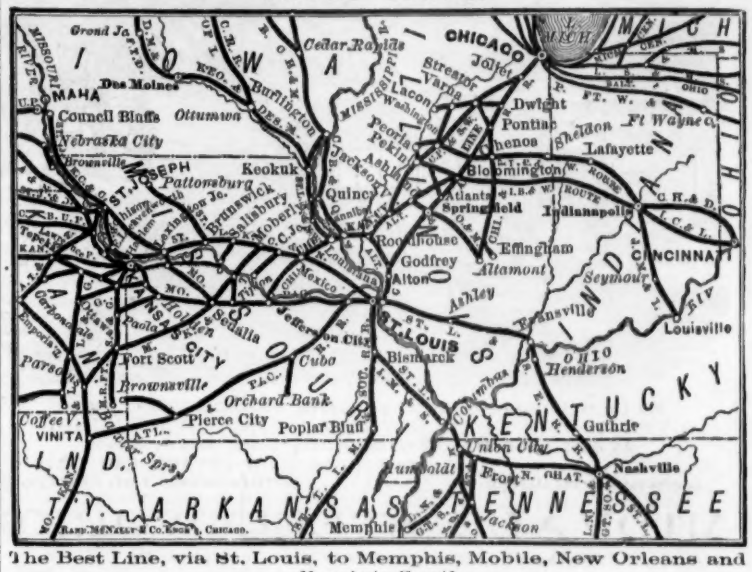

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